OFFICIAL PUBLICATION OF THE PROCEEDINGS AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS

AMERICAN

DYESTUFF REPORTER

DEVOTED TO TEXTILE CHEMISTRY • BLEACHING • DYEING • PRINTING • FINISHING

NOVEMBER 27, 1950
VOLUME 39, No. 24

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so right—so bright

if it's VAT DYES

ON RAYON

Customer satisfaction demands fast colors for many of today's rayons. Du Pont Ponsol* and Leucosol*... anthraquinone-type dyes ... and Sulfanthrene*... thioindigoid and related dyes ... produce superior light and wet fastness on rayons.

You can choose from a wide selection of Du Pont vat dyes to get attractive shades of outstanding fastness and uniformity.

Investigate the selection and application of these dyes. Our Technical Staff will be glad to help you. E. I. du Pont de Nemours & Co. (Inc.), Dyestuffs Division, Wilmington 98, Del.

Always dye with an eye to the end use

DU PONT
REG. U. S. PAT. OFF.

Du Pont Dyestuffs

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

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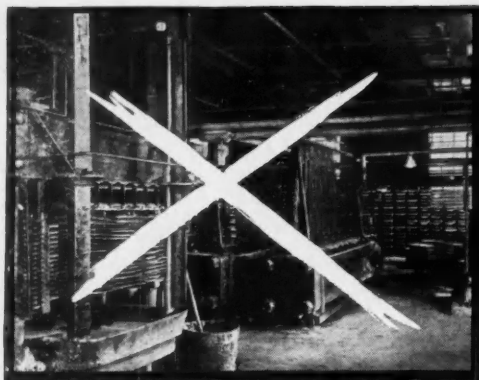

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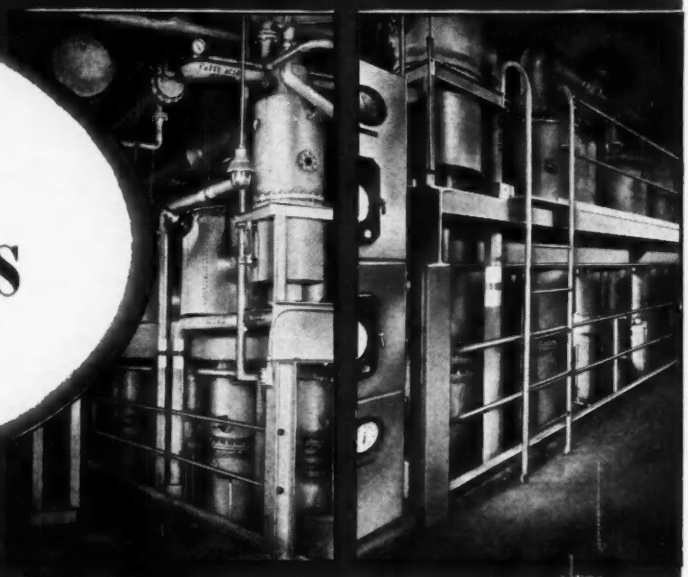
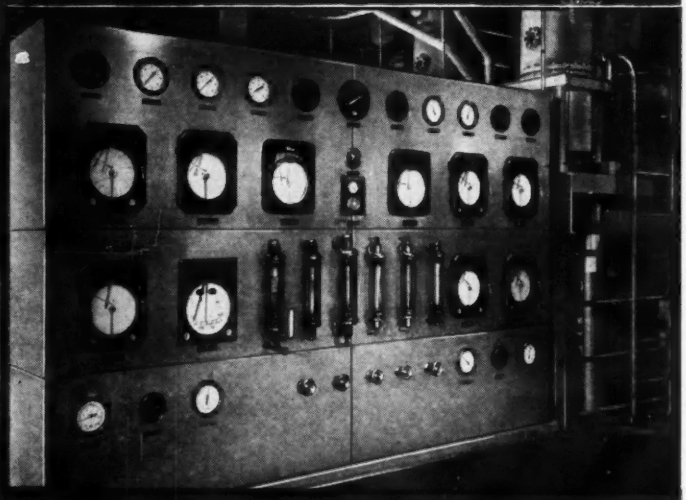
STEARIC and PALMITIC ACIDS
with these Important Advantages...





Emery

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an ANTIFOAMING agent
of unlimited capabilities

Depuma*

Breaks FOAM with *exceptional* efficiency

An odorless, viscous emulsion, **DEPUMA** de-foams without **emulsifying** or **evaporating.** When stirred into dye liquors and print pastes, it slowly rises to the surface, breaking the foam with amazing effectiveness.

PRINTING—Depuma does not affect the viscosity of print pastes, thus avoiding undesirable penetration and possible loss in color value.

DYEING—Depuma may be added to either acid or alkaline liquors.

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A.A.P. technicians will be happy to demonstrate **DEPUMA** at your plant. For detailed information on this important addition to the A.A.P. range of superior textile auxiliaries, as well as data regarding your individual requirements, consult our nearest branch.

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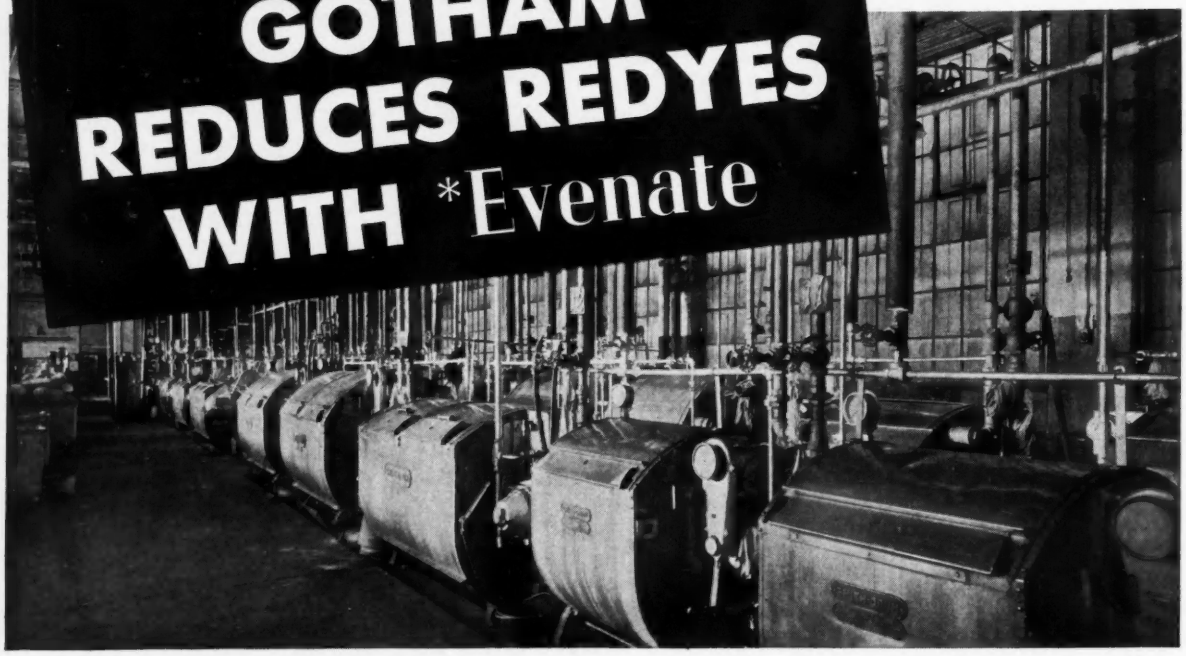
GOTHAM REDUCES REDYES WITH *Evenate

*Evenate is a thin paste readily soluble in the dyebath. It is a non-ionic condensate combined with a glyceride.



The makers of Gotham Gold Stripe Hosiery are constantly looking for new ways to improve production techniques and enhance hosiery values. With Evenate, the Gotham dyehouse in Philadelphia has found a way to cut redyes, achieve better unions between leg and welt, speed up pairing operations.

Evenate is the amazing new dye leveling agent that assures better control of dyebath, better penetration. Evenate reduces shade, maintaining union without stripping. Saves labor, saves dyes and finishes, frees dyehouse for other work.

Evenate also makes redyeing more economical. Reduces the number of shade variations in mixed dye lots. Non-foaming. Works equally well with acid colors and acetate dyes.

Try Evenate in your production. Let us give you full details.

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YOUR BEST BUY-- NATIONAL ANILINE VATS

Better color—bigger sales!
Put action-packed sales appeal
in your new lines with
the distinctive color effects
of National Aniline Dyes

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1950

Erase

IN ACETATE DYEING
WITH ATCONIL DAC-25

The New, Completely Efficient Acetate Dyeing Dispersing Agent!

ATCONIL DAC-25 is a new product possessing the combination of chemical and physical properties that has long been sought in an acetate dyeing dispersing agent.

With **ATCONIL DAC-25** specking, tarring, scumming, excessive foaming and poor dispersion are erased. The result is far more economy in processing through ease of handling, complete dispersion and efficient dyeing.

For top money value and high quality acetate dyeing specify . . .
ATCONIL DAC-25!

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SURE AS HOOTING...

TRITON X-100

speeds your processing from gray to finish

Makes water wetter —so it penetrates better

TRITON X-100 is a concentrated 100% active penetrant and detergent, non-ionic, and alkali-and-acid stable. As a scouring agent for wool, cotton and synthetic fibres, it is a fast wetter, an excellent detergent and an outstanding emulsifier for oil and grease. And in dyeing and finishing too, it speeds processing and cuts costs. Be wise and thrifty. Send for full details of TRITON X-100 today.

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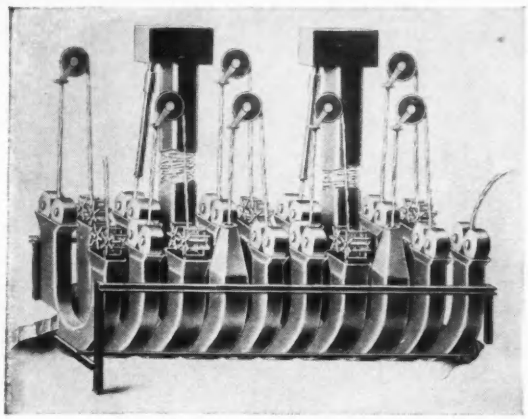


Courtesy: H. W. Butterworth & Sons Company, Philadelphia, Pa.
Two-stage "Junior" Continuous Peroxide Bleaching Unit

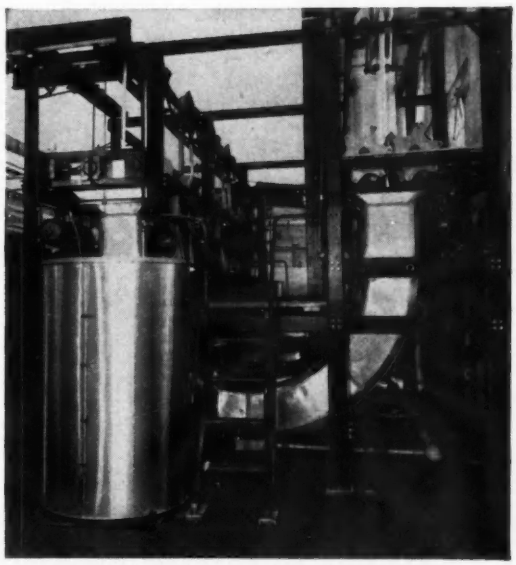
Smaller plants now getting quality and economies of continuous bleaching with BUTTERWORTH-DU PONT "JUNIOR" CONTINUOUS PEROXIDE BLEACHING UNIT

First installation at Kerriglen proves outstanding efficiency of new "Junior" Unit

Where production does not warrant full-size continuous bleaching range, the Butterworth-Du Pont "Junior" unit gets low-cost, quality results. Developed especially for the smaller finishing plant, the "Junior" unit has a rated capacity of 500 to 1000 lbs. of cloth per hour. It is also an economical auxiliary unit for specialty work in larger mills which have standard ranges.

The "Junior" unit is a *complete* bleaching range designed on the principles of Du Pont Continuous Peroxide Bleach. Job-tested and proved on production bleaching of cotton piece goods, the new unit, according to the manufacturer, can cut costs three ways. It provides steam savings as high as 75%, reduces chemical costs, and requires only one operator. What's more, the "Junior" unit is extremely compact . . . the single stage uses a floor space only 13 x 16 feet and 25 feet maximum height.

The new "Junior" unit is performing remarkably well at the Kerriglen Finishing Company where the first installation is now bleaching cotton print cloth. Kerriglen reports consistent production of high quality bleach at considerable cost savings—with no loss of cloth strength.



Two-stage "Junior" in operation at Kerriglen Finishing Co., Providence, R. I.

With this new unit every mill can get continuous low-cost, quality bleaching. Perhaps the "Junior" unit is just what your mill needs to increase efficiency. For more information on this economical unit, and on Du Pont Continuous Peroxide Bleach, send the coupon below.

DU PONT
CONTINUOUS PEROXIDE BLEACHING

DU PONT
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BETTER THINGS FOR BETTER LIVING
...THROUGH CHEMISTRY

E. I. du Pont de Nemours & Co. (Inc.)
Electrochemicals Department, Wilmington 98, Del.

Please send me more information about Du Pont Continuous Peroxide Bleaching Systems.

Name_____ Title_____

Firm_____

Street & No._____

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KERANOL NK

(Reg. U. S. Pat. Off.)

gives **COTTONS AND RAYONS**

a very **DESIRABLE, SOFT, FULL HAND**

durable to **WASHING AND DRY-CLEANING**

Unaffected by pH variations in the finishing bath—compatible with Resins—very resistant to yellowing, even at excessively high temperatures. Write for our technical service bulletin #208-110.1

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even
a child
can
feel
the
difference!

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LUXOLENE D

THE SUPERIOR FINISHING OIL FOR FINE COTTONS, RAYONS, ACETATES

It's the rule of the thumb—the feel of the fabric that often makes the sale!

DREW SOLUBLE LUXOLENE D will give your fabrics the finishing touch that distinguishes them above all others. For **SOLUBLE LUXOLENE D** has no equal in imparting a soft, mellow, full-bodied hand with exquisite draping qualities. Even a child can *feel* the difference.

DREW SOLUBLE LUXOLENE D resists oxidation, scorching, discoloration and the development of odors.

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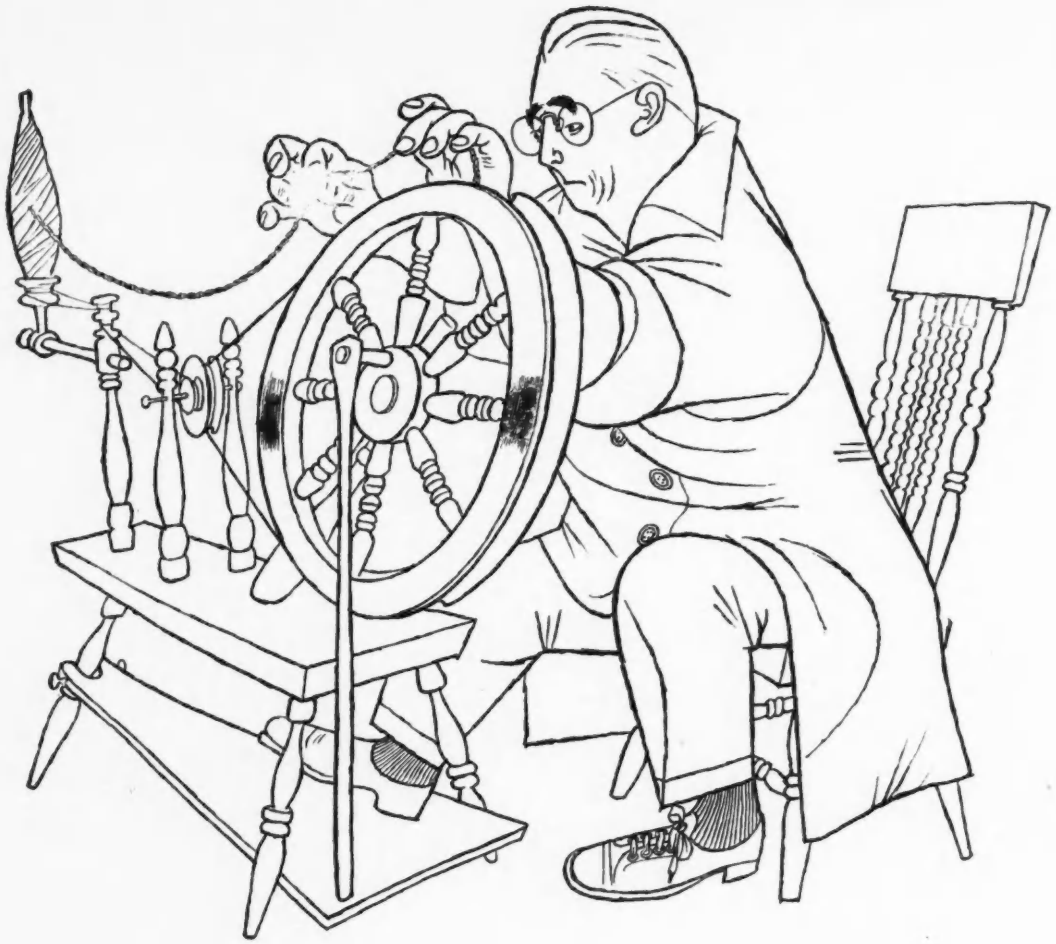

If you make textiles...

(No matter how you make them, you need detergents.)

the Armour man is the man to see because he has more different soaps and synthetics than anybody!

(He's bound to have just the ones you need. Write him today.)

ARMOUR *Industrial Soap Division*

Armour and Company • 1355 West 31st Street • Chicago 9, Illinois

for high efficiency in

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DYE OXIDATION

use **BECCO**

PEROXYGEN

compounds

••• You can get whiter, brighter goods at lower cost with BECCO Continuous Hydrogen Peroxide Bleaching. This flexible process, using J-Boxes, couples the efficiency of a continuous flow of goods with the lower overall cost of a BECCO Hydrogen Peroxide bleach. Hydrogen Peroxide 35% and 50% are *safe* bleaches; their mildly alkaline solutions of active oxygen give a highly effective bleaching action. Compared to the batch method, you save on chemicals, steam and overhead.

Hydrogen Peroxide safely and effectively oxidizes vat dyes on all fibers. Easily added to the bath, it rinses freely, leaving no residue.

Other BECCO Peroxygen chemicals for specialized bleaching processes include Peracetic Acid 40% for alkali-sensitive fibers, Sodium Carbonate Peroxide and Sodium Pyrophosphate Peroxide . . . doubly useful as alkaline bleaching agents and detergents.

It will pay you to discuss your bleaching operations with a BECCO representative, a specialist in continuous peroxide bleaching and in the treatment of textiles with active peroxygen compounds. For further information, use the convenient coupon below.

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☐ Please send me literature on BECCO Continuous Peroxide Bleaching.
☐ Please have a BECCO representative call.

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Company.....
Address.....
City.....Zone.....State.....ADR-11-50

HOOKER MONOCHLOROACETIC ACID

To Make Today's Products Better

Versatile Monochloroacetic Acid is aptly called "today's intermediate" because so many currently important products can be made from it.

That's why your choice of a source for this important chemical should be made carefully. As a major producer of Chlorine and chlorine products, Hooker has a fund of technical experience of great value in the production and the use of such products as this. In addition Hooker produces Monochloroacetic Acid in a new plant especially designed for the purpose. As a result, the Hooker product is of high quality, dependably uniform, and available in quantities that match your production needs.

Listed below are some of the characteristics of Hooker Monochloroacetic Acid. Technical Data Sheet 752-B gives more complete listing of physical and chemical properties. It will be sent you upon request made on your company letterhead.

MONOCHLOROACETIC ACID

DESCRIPTION: White crystalline material with a strong sweetish odor. Corrosive to the skin. Very soluble in water and benzene; soluble in most organic solvents.

Synonyms	Chloroacetic Acid, Chloroethanoic Acid	Boiling Point	189°C
Formula	$CH_2ClCOOH$	Solubility	
Molecular Weight	94.5	Water	Very soluble
Freezing Point	61.6°C	Benzene	Very soluble
		Other organic solvents	Generally soluble

USES: Intermediate in manufacture of carboxymethylcellulose, 2,4-dichlorophenoxyacetic acid, cyanoacetate, indigoid and thioindigoid dyes, ammonium thioglycolate, thioglycolic acid, glycine and other chemicals of commercial importance. It has been suggested as a preservative alone or in connection with other compounds for hides, skins, etc.

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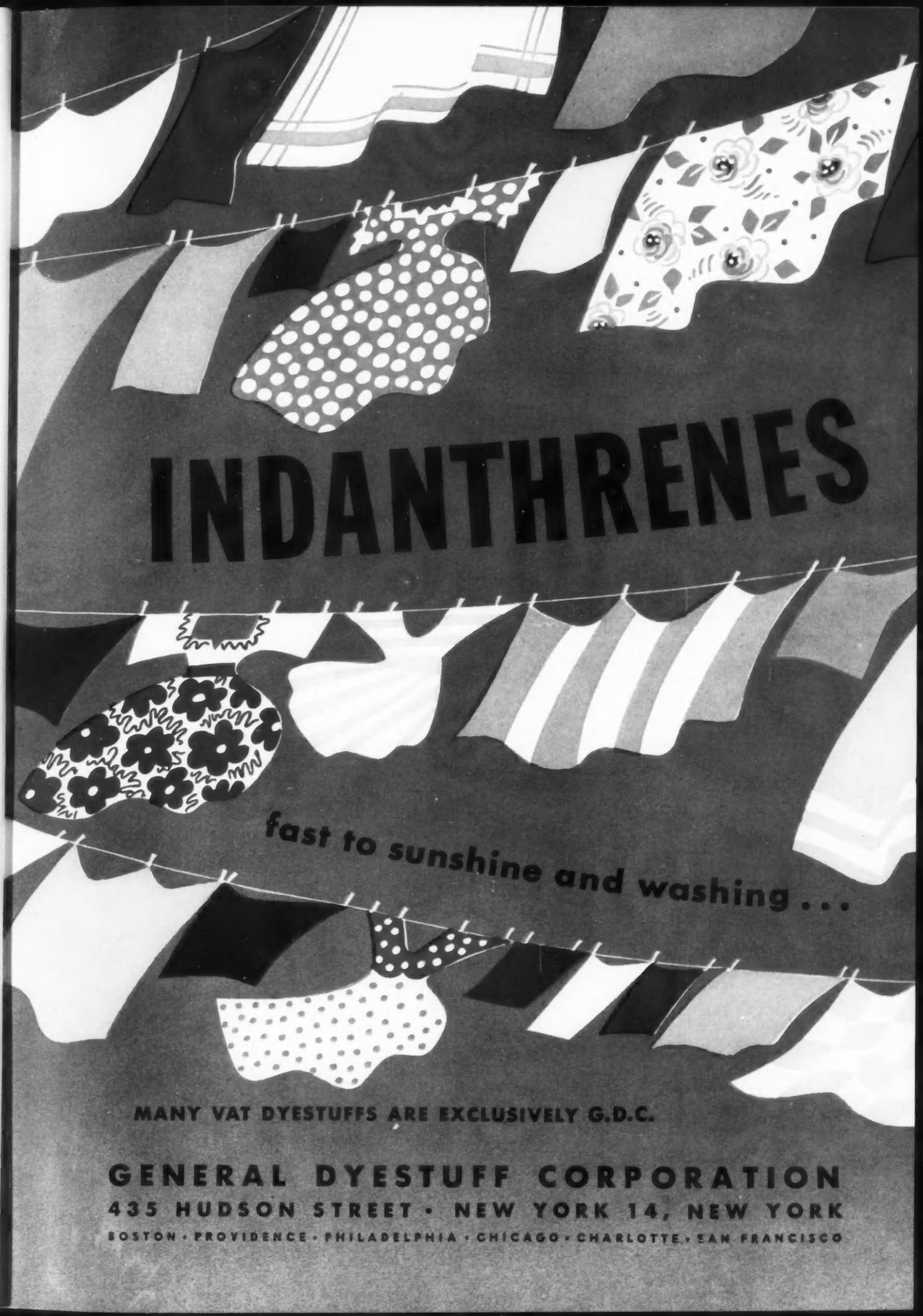
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fast to sunshine and washing . . .
MANY VAT DYESTUFFS ARE EXCLUSIVELY G.D.C.
GENERAL DYESTUFF CORPORATION
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for acetate and nylon

For blues, deep and clear or light and frosty—for greens, violets, browns and grays—for economical dyeings on acetate and nylon you can't beat

EASTMAN BLUE BNN

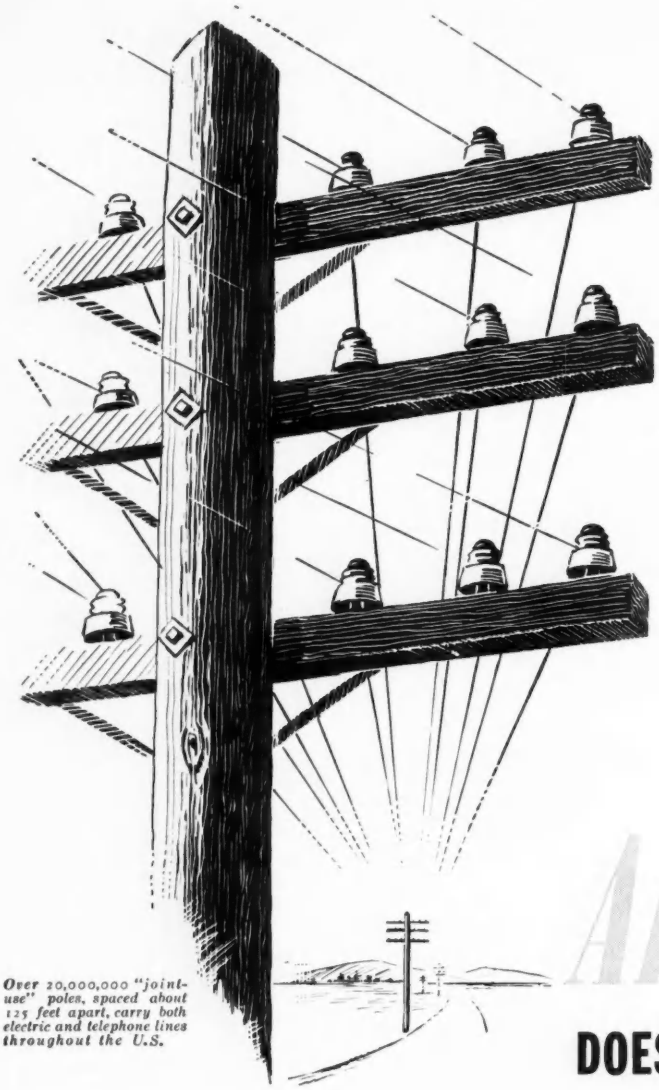
Low in cost, with excellent color value, Eastman Blue BNN occupies a number-one spot in drug rooms throughout the industry. Its light fastness properties, its superior dyeing characteristics, its suitability for cross dyeing and its color constancy under artificial and natural lighting are all good reasons why this dye is so well known and widely used.

If you are not familiar with Eastman Blue BNN, please let us know so that we can send you sample quantities for your evaluation.

Write to Tennessee Eastman Corporation (Subsidiary of Eastman Kodak Company), Kingsport, Tennessee.

Eastman Acetate Dyestuffs are sold in the United States through Tennessee Eastman Corporation in Kingsport, Tennessee, and Lodi, New Jersey. On the West Coast, through Wilson & Geo. Meyer & Co.: San Francisco, Los Angeles, Portland, and Seattle. In Canada, through Clough Dyestuff Company Ltd., 33 St. Mathieu Street, St. Laurent, Quebec.

Eastman Acetate Dyestuffs



Over 20,000,000 "joint-use" poles, spaced about 125 feet apart, carry both electric and telephone lines throughout the U.S.

Amprozyme

DOES TWO JOBS AT ONE TIME

New De-Sizing Powder Converts Both Starches and Proteins in One Operation

Amprozyme does two jobs better, faster and cheaper. It eliminates the guess work from de-sizing by digesting either starches or proteins, or both, at the same time and in the same operation. If the size is starch, Amprozyme's amylolytic enzymes go right to work. If a protein size is present, its proteolytic enzymes start attacking. Amprozyme insures rapid and complete de-sizing of cottons, rayons, and mixed goods, resulting in a good hand and uniform ground for perfect dyeing, without streaks or shading. Amprozyme eliminates the necessity for two different agents or two separate operations thus reducing storage, handling and shipping costs. It can be utilized at normal or elevated dyebox temperatures, in a wide pH range. Amprozyme also remains stable longer. Detailed information and a sample for a test run are available upon request.

Plants: Passaic, N. J.
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JACQUES WOLF & CO.
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NYTRON

TRADE MARK REG. U.S. PAT. OFF.

offers A DIFFERENT COMBINATION OF PROPERTIES

FOR TEXTILE PROCESSING

NYTRON, Solvay's new, low-cost wetting agent-detergent, offers a new combination of properties to the textile processing industry . . . a combination available in no other synthetic organic detergent. Add NYTRON to soaps, acids and alkalies . . . try it for soaping-off, dye leveling, scouring and all other wet processes where wetting, penetration, detergency and rinsability are important factors.

NO OTHER SYNTHETIC ORGANIC DETERGENT CAN MATCH NYTRON'S EXCLUSIVE COMBINATION OF PROPERTIES

EXCEPTIONAL DETERGENCY—in cold or hot water . . . retains its detergent action when used in either acid or alkaline mediums

EXCELLENT WETTING—reduces wetting time from hours required in plain water to a matter of seconds

QUICK, THOROUGH RINSING—even in cold water; does not leave an insoluble deposit

COUNTERACTS HARD WATER DIFFICULTIES—will not form hard water curd; more economical because increased quantities do not have to be added to compensate for water hardness

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REDUCES SURFACE TENSION—addition of only 3½ ounces to 100 gallons of water will reduce surface tension by more than 50%; this action is actually enhanced under hard water conditions

Use NYTRON *for Wools, Nylons, Rayons, Cottons*

- **scouring prior to yarn and cloth dyeing**
- **rope soaping of dyed cloth**
- **a penetrating and leveling agent in dyeing operations**
- **carbonizing of wool (wetting and penetrating)**
- **scouring woolen, rayon and nylon piece goods**
- ***many other operations***

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Samples of NYTRON are available on request. Mail this coupon now for your free sample—no obligation.

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BF-11

Just as lovely and soft as the day they were bought!

When cotton, acetate, bemberg and mixed constructions of these fibers are finished with

THE ONYXSANS*

their soft, attractive finish lasts for the life of the garment or fabric. Even on other fibers, wash-resistance is good. The Onyxsans offer you the widest possible range of hands, from the firm, mellow feel of printed draperies, to the satin-smooth softness of a baby's skin. No wonder they are the standard of comparison when hands are involved in the finishing operation.

The Onyxsans give you no troubles with mark-off, rancidity, odors or stiffness. And they're uniform and stable. There are no process changes when you use them. They are applied in the usual way in the pad, jig, quetsch or dye beck.

Not the least attractive feature of the Onyxsans is the fact that a little goes a long way. They're very economical to use.

*Trade Mark Reg. U. S. Pat. Off.

Write for Technical Bulletin TX-1, which covers THE ONYXSANS.*

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CHICAGO • BOSTON • CHARLOTTE • ATLANTA

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engineers who design for long life specify TRENTWELD

Here are 7 reasons why TRENTWELD is better

1. Largest variety of sizes—4½" to 30" inclusive
2. Finished tubing... machine-formed, machine-welded, machine-sized for uniformity
3. Made in a *tube* mill by *tube* experts
4. Made from tested cold rolled sheets . . . completely fused into finished tubing *without* added rod metal
5. No zone of weakness for corrosion to attack
6. Uniform section, metallurgically correct
7. Available for fabrication with any fittings

Trentweld Large Diameter (4½" to 30") Stainless Steel Tubing should not be compared to rolled up and hand welded sheets: Trentweld tubing is machine formed and machine welded without metal added. The weld is fused to the parent metal by an exclusive Trent development. That's what makes the difference, and that's why more and more fabricators, designers and manufacturers of all types of processing equipment are turning to Trent for their tubing requirements.

When you do business with Trent, you get top quality tubing PLUS engineering assistance to put stainless tubing to work in your application . . . better! Write for Trentweld Data Bulletin and tell us the application you have in mind.

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Subsidiary of Crucible Steel Company of America
General offices and plant: East Troy, Wisconsin
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TRENTWELD

STAINLESS STEEL TUBING

print **brighter** colors with this new, non-corrosive, acid-forming catalyst

Now you can print brighter, sharper, clearer colors on silk, cotton, rayon and linen with vat soluble ester printing pastes . . . if you use Pfizer Ammonium Gluconate as the acid-forming catalyst.

This stable, non-toxic, non-corrosive salt reacts upon steaming to yield an efficient, non-volatile medium. Brilliant prints result from the ability of Ammonium Gluconate to:

1. **make more stable pastes.**
2. **inhibit the dulling action of metallic ions by its sequestering action.**
3. **develop greater color value.**

Pfizer Ammonium Gluconate is available as a dry, free-flowing, odorless, readily soluble powder in 50 and 100-lb. drums and in 250-lb. barrels. Write today for samples, prices and Technical Bulletin No. 6.

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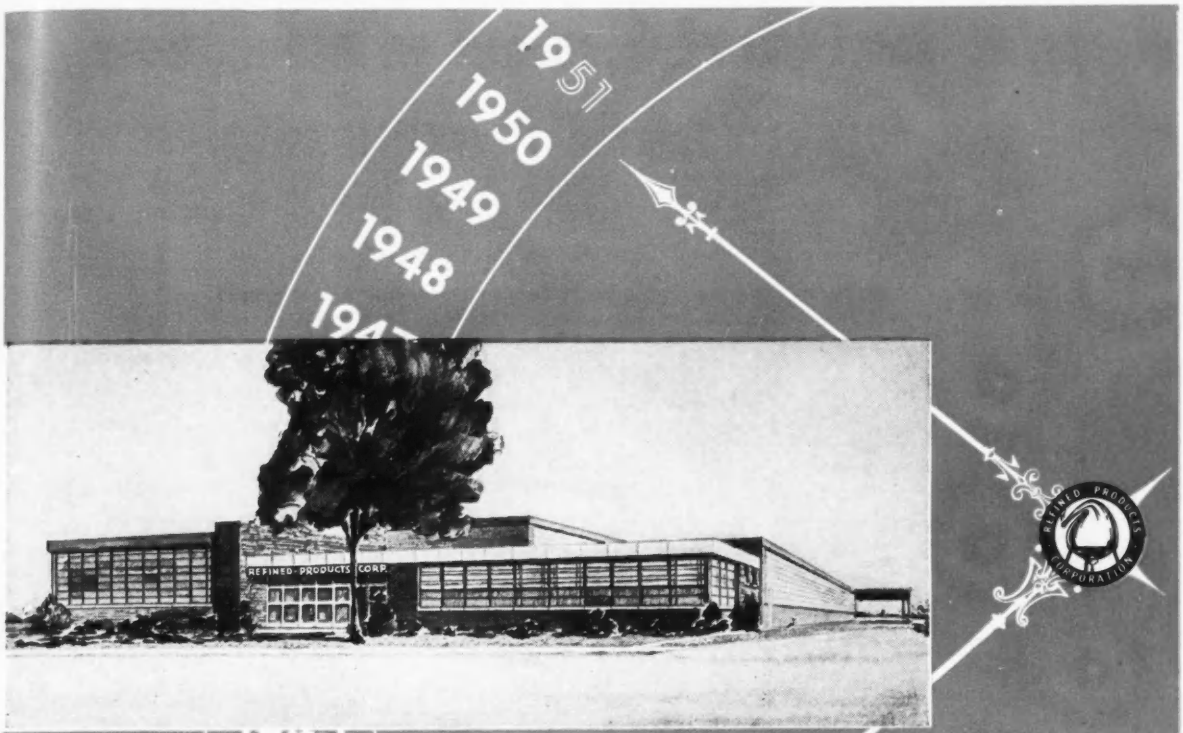

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Extensive chemical research laboratories and ultra modern processing equipment produce better products more economically.

For more than 12 years we have manufactured chemical specialties for the textile and allied industries.

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We suggest that you write for complete set.

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VOLUME 39 NUMBER 24

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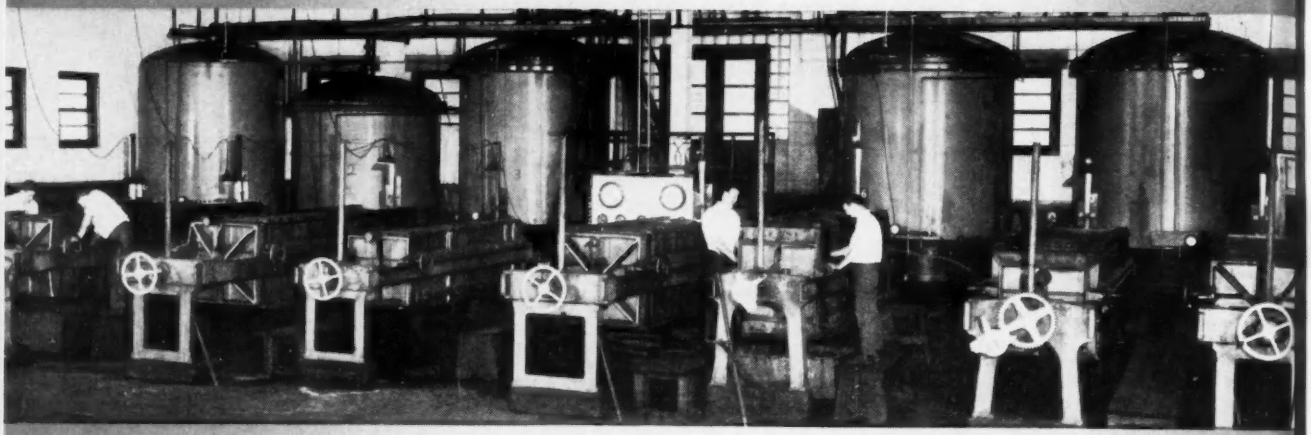

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A COMPARISON OF THE BREAKDOWN PRODUCED BY ABRASION, USING FOUR COMBINATIONS OF WHEELS AND PRESSURES ON THE TABER ABRASER

MARGARET HARRIS ZOOK
Ellen H. Richards Institute
The Pennsylvania State College

INTRODUCTION

IN a previous paper by the author *(2)*, results obtained from the use of the Taber Abraser with a three-wheel test procedure were reported. Consideration was given to the numerous variables within the method which affected reproducibility of results, and (a) a statistical method for control was instituted; (b) a change of technique for mounting the samples was introduced; and (c) the use of three carefully selected pairs of wheels was instituted as a means of reducing the variables within the method.

The present study has dealt with a comparison of the breakdown in strength in typical rayon fabrics produced by four usual combinations of wheels and pressures using the Taber Abraser. The fabrics represented different weave and weight types. The objective of the investigation was to ascertain whether any one of the four combinations appeared to be more suitable than the others for any particular type or types of rayon fabrics.

METHODS OF PROCEDURE

Using the three-wheel abrasion test procedure developed and explained in a previous report by Zook *(2)*, the four combinations of wheels and pressures employed in this study were as follows:

(1) CS 10 calibrase wheels—500 grams pressure.

(2) CS 10 calibrase wheels—250 grams pressure.

(3) CS 8 calibrase wheels—500 grams pressure.

(4) CS 8 calibrase wheels—250 grams pressure.

This is the third in a series of reports on methodology studies relating to the testing of textile fabrics for resistance to abrasion, from the laboratory of the Ellen H. Richards Institute, sponsored by the American Viscose Corporation.

The Taber Abraser Standard Research Model E-4010 was used for the study, together with the Vacuum Pickup Attachment Model 100-108 and the Powerstat Regulator for removing detritus from the abraded sample; the five-power Illuminated Magnifier and the Duplex Refacing Stone St-11 also were employed.

Twelve fabrics, listed below in ascending order of weight, served the purpose of the study. These have been described in Table I of the preceding paper of this series by Zook *(2)*, as cited. These were as follows:

Fabric Number	*Description*	*Weight (ounces per square yard)*
(1)	Blue Satin	2.5
(2)	Chartreuse Taffeta ..	2.5
(3)	Blue Twalle	2.6
(4)	Rose Twalle	2.7
(5)	Cream Fuji	3.4
(6)	Blue Gabardine	4.6
(7)	Tan Gabardine	4.8
(8)	Satin Lining	5.2
(9)	Red Salyna	5.6
(10)	Tackletwill A	5.6
(11)	Tackletwill B	6.2
(12)	Tackletwill C	6.7

Using the standard control fabric, the machine and wheels were checked against the control chart each week, as explained in previous reports of this series *(1) (2)*. The author used only those wheels which fell within the range of chance as established by the control test. In any one test, wheels which varied toward fineness within the prescribed limits served to balance those which varied toward roughness, also within the established range.

The combinations of wheels and pressures listed above were carried to each of five or more cycle stations at intervals depending on the abrasion resistance of the fabric and on the conditions used; the number of cycles which showed near a 100 per cent breaking strength loss in at least one direction served as the final cycle station.

Warp and filling breaking strength strips abraded parallel to the yarn were used as described under the preliminary test procedure given in previously mentioned Report Number 2 of this series.

PRESENTATION OF DATA

Figure 1 shows the percentages of strength loss obtained with the four combinations of wheels and pressures previously described. Table I includes the average standard deviations of the percentage strength changes of the 12 experimental fabrics. In order to compare one test combination with another, Table II serves to show the approximate number of cycles at which 25, 50, 75, and 100 per cent strength losses occurred in each fabric in the direction of greatest breakdown, estimated from the graphs in Figure 1.

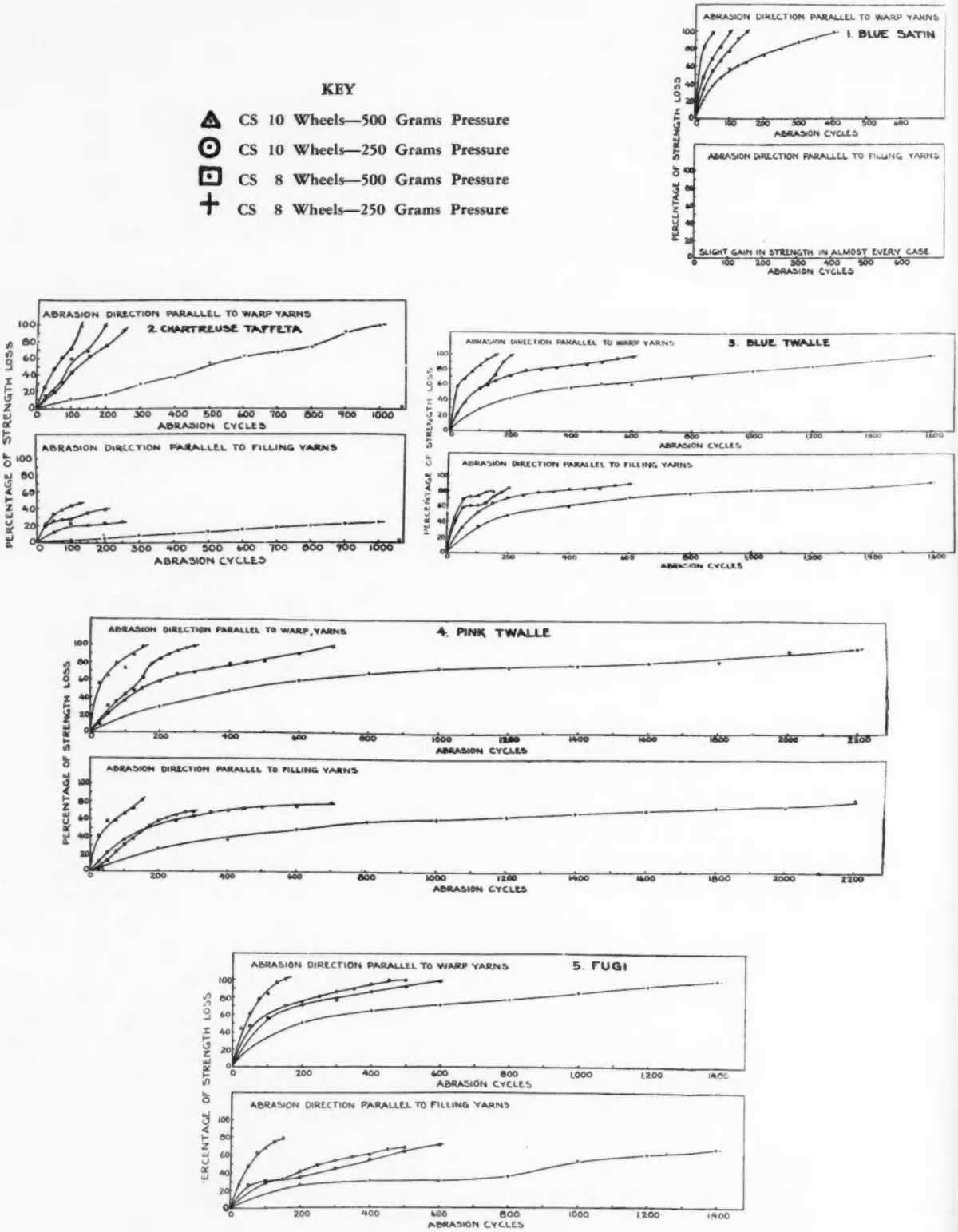
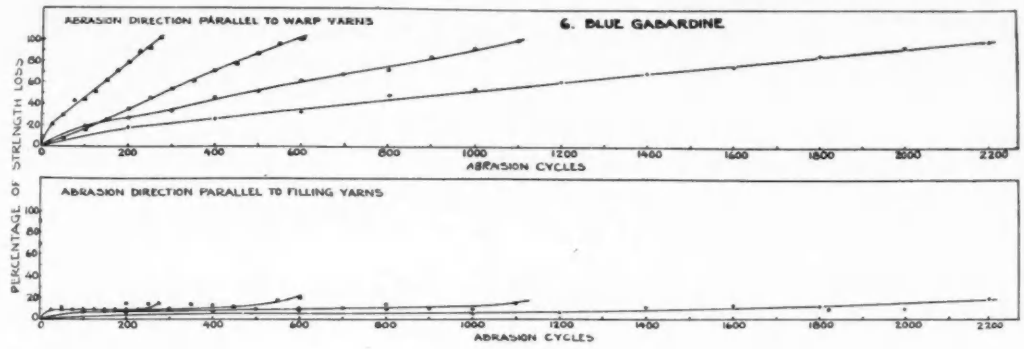
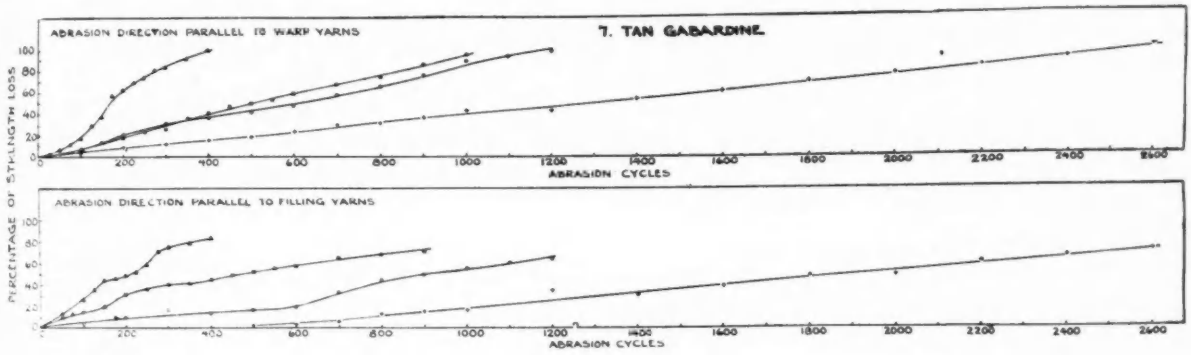
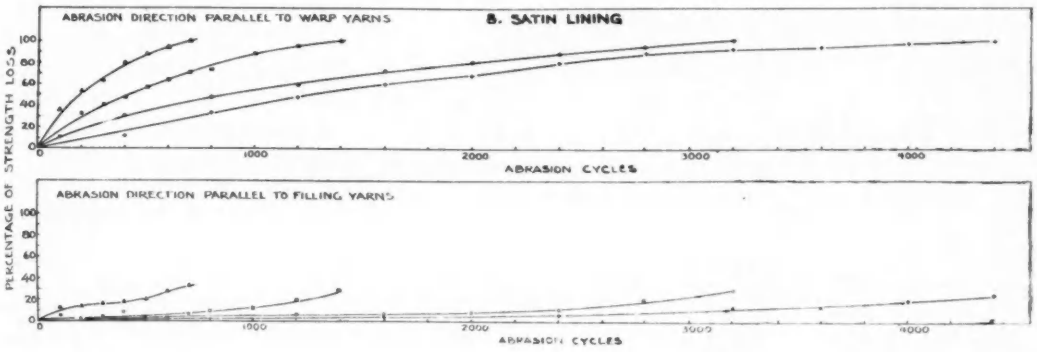

KEY
CS 10 Wheels—500 Grams Pressure
CS 10 Wheels—250 Grams Pressure
CS 8 Wheels—500 Grams Pressure
CS 8 Wheels—250 Grams Pressure
ABRASION DIRECTION PARALLEL TO WARP YARNS
1. BLUE SATIN
ABRASION DIRECTION PARALLEL TO FILLING YARNS
SLIGHT GAIN IN STRENGTH IN ALMOST EVERY CASE
PERCENTAGE OF STRENGTH LOSS
ABRASION CYCLES
ABRASION DIRECTION PARALLEL TO WARP YARNS
2. CHARTREUSE TAFFETA
ABRASION DIRECTION PARALLEL TO FILLING YARNS
3. BLUE TWALLE
4. PINK TWALLE
5. FUGI

Figure 1
Relationship of Abrasion Cycles to Breaking Strength Loss as Produced by Four Combinations of Wheels and Pressures.







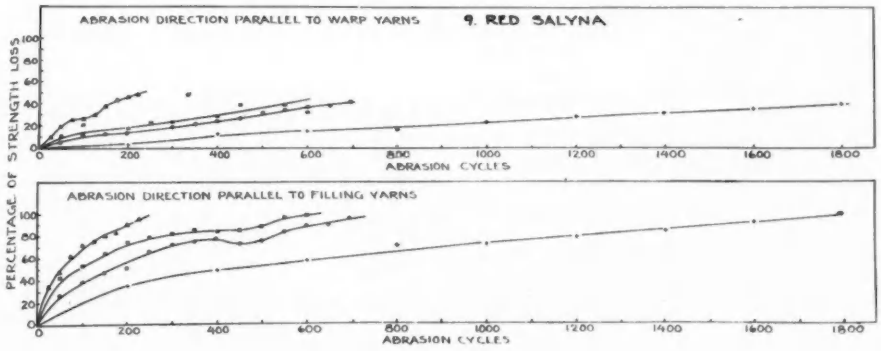


Figure 1 (Continued)

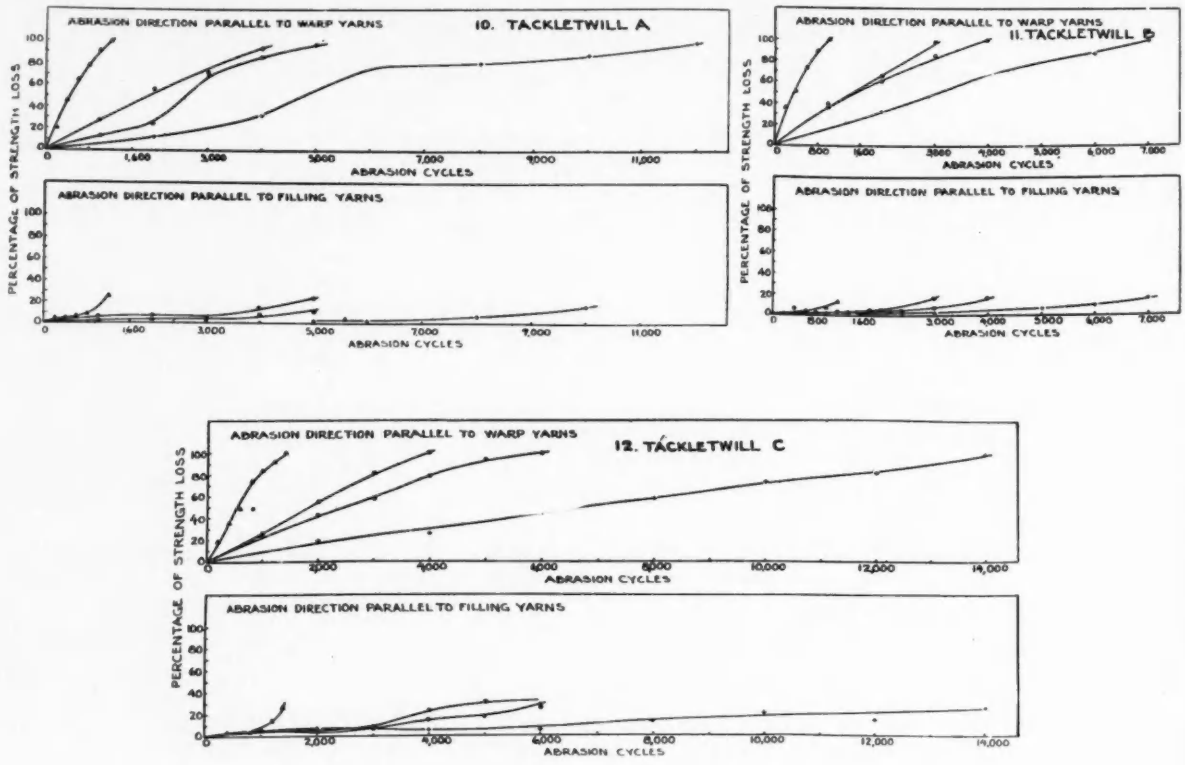

ABRASION DIRECTION PARALLEL TO WARP YARNS
10. TACKLETWILL A
ABRASION DIRECTION PARALLEL TO FILLING YARNS
PERCENTAGE OF STRENGTH LOSS
ABRASION CYCLES
ABRASION DIRECTION PARALLEL TO WARP YARNS
11. TACKLETWILL B
ABRASION DIRECTION PARALLEL TO FILLING YARNS
PERCENTAGE OF STRENGTH LOSS
ABRASION CYCLES
ABRASION DIRECTION PARALLEL TO WARP YARNS
12. TACKLETWILL C
ABRASION DIRECTION PARALLEL TO FILLING YARNS
PERCENTAGE OF STRENGTH LOSS
ABRASION CYCLES

Figure 1 (Concluded)

DISCUSSION OF FINDINGS

In every instance, the CS 10 calibrase wheels with 500 grams of pressure caused the fastest breakdown in strength, and the CS 8 calibrase wheels with 250 grams of pressure caused the slowest breakdown. A variation occurred in the results from the CS 10 wheels with 250 grams pressure and the CS 8 wheels with 500 grams pressure, the first appearing to be most severe only on fabrics 2, 5, and 10, and on 11 at 25 and 50 per cent loss points, but not at positions causing 75 and 100 per cent loss. An explanation for this difference in results obtained on these fabrics may be given by the fact that the removed finish from certain fabrics seemed to clog the CS 8 wheels more than it did the CS 10 wheels.

In many cases, the relationship was so close that it scarcely can be said that either one or the other was the more severe, with the results of both lying within the range of probable error within the test.

Except in two cases, Fabrics Number 7 and Number 11, the relationship of one test with another stayed the same throughout the four percentage strength loss levels. In these two cases, the finish probably was responsible; when the latter

TABLE I
AVERAGE STANDARD DEVIATIONS OF THE 12 EXPERIMENTAL FABRICS USING FOUR COMBINATIONS OF WHEELS AND PRESSURES

	Warp Direction				*Filling Direction*			
	CS 10 Wheels		*CS 8 Wheels*		*CS 10 Wheels*		*CS 8 Wheels*	
Fabric	*500 grams pressure*	*250 grams pressure*	*500 grams pressure*	*250 grams pressure*	*500 grams pressure*	*250 grams pressure*	*500 grams pressure*	*250 grams pressure*
(1) Blue Satin	0.44	0.99	0.89	0.92	0.33	0.53	0.39	1.15
(2) Chartreuse Taffeta ...	0.78	0.69	1.06	1.16	0.68	0.45	0.51	0.94
(3) Blue Twalle	0.96	0.89	1.16	1.15	0.91	0.99	1.31	1.11
(4) Pink Twalle	0.91	0.96	1.01	1.06	1.20	1.14	1.21	1.24
(5) Fiji	1.53	1.05	0.91	1.13	1.11	1.24	1.14	1.36
(6) Blue Gabardine	2.36	3.42	3.10	1.10	1.60	1.92	2.04	1.83
(7) Tan Gabardine	1.96	2.17	2.12	2.01	2.19	1.57	2.32	2.25
(8) Lining Satin	2.09	2.41	2.35	2.85	1.90	2.04	1.30	1.37
(9) Red Salyna	1.64	1.76	1.49	2.48	1.13	1.32	1.09	1.25
(10) Tackletwill A	4.69	3.96	4.00	2.67	1.86	3.35	1.49	1.47
(11) Tackletwill B	2.37	2.86	2.15	3.72	2.16	2.42	2.47	2.99
(12) Tackletwill C	2.59	1.31	2.26	2.53	1.99	2.61	3.88	2.09

TABLE II

APPROXIMATE NUMBER OF CYCLES AT WHICH FOUR PERCENTAGES OF BREAKDOWNS OCCURRED WITH FOUR COMBINATIONS OF ABRASIVE WHEELS AND PRESSURES IN THE DIRECTION OF GREATEST BREAKDOWN

		NUMBER OF CYCLES															
Fabric Number	*Strength Loss*	*25 per cent*				*50 per cent*				*75 per cent*				*100 per cent*			
	Wheels	*CS 10*		*CS 8*		*CS 10*		*CS 8*		*CS 10*		*CS 8*		*CS 10*		*CS 8*	
	Pressures (grams) ..	500	250	500	250	500	250	500	250	500	250	500	250	500	250	500	250
(1)	Blue Satin	3	16	9	35	12	40	29	95	18	87	58	190	50	150	100	350
(2)	Chartreuse Taffeta ..	25	53	65	250	55	95	130	500	93	150	200	750	125	200	265	1000
(3)	Blue Twalle	7	30	28	90	22	80	78	300	60	225	154	925	150	600	200	1500
(4)	Pink Twalle	11	72	40	175	30	150	120	475	64	330	178	1025	150	800	300	2200
(5)	Fuji	12	35	50	75	33	90	110	225	62	200	250	575	130	450	625	1400
(6)	Blue Gabardine	40	175	150	275	110	300	290	925	183	800	445	1525	275	1100	600	2200
(7)	Tan Gabardine	120	250	300	650	160	625	500	1350	260	900	800	2000	350	1400	1100	2600
(8)	Satin Lining	70	300	150	875	180	900	400	1350	350	1725	725	2300	700	3200	1400	4400
(9)	Red Salyna	12	50	30	150	45	175	90	425	110	375	240	900	250	800	600	2300
(10)	Tackletwill A	200	700	1700	3300	475	1800	2600	5000	750	2900	3500	7200	1200	5000	5400	12000
(11)	Tackletwill B	125	500	800	1500	350	1300	1500	3300	625	2400	2250	5000	1000	4000	3000	7000
(12)	Tackletwill C	250	1000	800	3500	550	2500	1900	7000	850	3800	2800	10500	1400	6000	4000	14000

once was broken down, it ceased to interfere and the action then preceded at a faster rate. In general, it appeared that the CS 8 wheels with a 500-gram load were more severe in their abrasive action than the CS 10 wheels with a 250-gram load, even with the seeming exceptions which have been noted.

It is not possible to state from the results of this study that x cycles in any one combination equal y cycles in another. In addition, consideration of the foregoing results show that the progressive weakening of a fabric, resulting from abrasion in any direction, cannot be characterized by any single law. That is, the number of cycles required to produce a 25 per cent strength loss is no basis for computing the number of cycles which would be needed to produce a 75 or any other percentage strength loss. Thus it would not be possible to predict the exact results of any one test combination from the results of another.

An examination of the standard deviations of the means for each combination used showed that the variability was somewhat less using the CS 10 wheels with 500 grams pressure. The ranges of the standard deviations on all four test combinations were in general similar, however, and those fabrics which showed a larger standard deviation and a wider range of standard deviations with one combination showed a similar change with other combinations.

THE RANKING ORDER OF ABRASIVE RESISTANCE OF FABRICS WITH THE USE OF FOUR COMBINATIONS OF WHEELS AND PRESSURE—

Table III was formulated to determine whether or not the four different combinations in use in this study tended to rank the experimental fabrics in the same or-

TABLE III

THE RANKING ORDER OF ABRASION RESISTANCE OF THE 12 EXPERIMENTAL FABRICES AT FOUR PERCENTAGE BREAKDOWN POINTS BY FOUR COMBINATIONS OF WHEELS AND PRESSURES IN THE DIRECTION OF GREATEST BREAKDOWN

	25 per cent Strength Loss				*50 per cent Strength Loss*				*75 per cent Strength Loss*				*100 per cent Strength Loss*			
Rank Order	*CS 10 Wheels*		*CS 8 Wheels*		*CS 10 Wheels*		*CS 8 Wheels*		*CS 10 Wheels*		*CS 8 Wheels*		*CS 10 Wheels*		*CS 8 Wheels*	
	500 grams	*250 grams*	*500 grams*	*250 grams*	*500 grams*	*250 grams*	*500 grams*	*250 grams*	*500 grams*	*250 grams*	*500 grams*	*250 grams*	*500 grams*	*250 grams*	*500 grams*	*250 grams*
1	12	12	10	12	12	12	10	12	12	12	10	12	12	12	10	12
2	10	10	12,11	10	10	10	12	10	10	10	12	10	10	10	12	10
3	11	11	x	11	11	11	11	11	11	11	11	11	11	11	11	11
4	7	8	7	7	8	8	7	7,8	8	8	7	8	8	8	8	8
5	9	7	8.6	8	7	7	8	x	7	7	8	7	7	7	7	7
6	8	6	x	6	6	6	6	6	6	6	6	6	6	6	5	9
7	6	4	2	2	2	9	2	2	9	9	5	4	9	4.9	6,9	6,4
8	2	2	5	4	9	4	4	4	2	4	9	3	3,4	x	x	x
9	5	9	4	9	5	2	5	9	4	3	2	9	x	3	4	3
10	4	5	9	3	4	5	9	3	5	5	4	2	5	5	2	5
11	3	3	3	5	3	3	3	5	3	2	3	5	2	2	3	2
12	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

TABLE IV

APPROXIMATE TIME REQUIRED FOR ABRASION TEST PROCEDURE FOR THE FOUR COMBINATIONS OF WHEELS AND PRESSURE TO RUN APPROXIMATELY TO A 100 PER CENT STRENGTH LOSS

Fabric	CS 10 Wheels		CS 8-Wheels	
	500 grams	250 grams	500 grams	250 grams
(1) Blue Satin	10 minutes	30 minutes	20 minutes	1½ hours
(2) Chartreuse Taffeta	22 minutes	35 minutes	47 minutes	3 hours
(3) Blue Twalle	30 minutes	1½ hours	23 minutes	4 hours
(4) Pink Twalle	30 minutes	2½ hours	30 minutes	6½ hours
(5) Fuji	30 minutes	1½ hours	2 hours	4 hours
(6) Blue Gabardine	1 hour	4 hours	2 hours	8 hours
(7) Tan Gabardine	1 hour	4 hours	4 hours	7½ hours
(8) Satin Lining	1½ hours	8 hours	3½ hours	12 hours
(9) Red Salyna	45 minutes	1½ hours	1½ hours	6 hours
(10) Tackletwill A	4 hours	14½ hours	14½ hours	29 hours
(11) Tackletwill B	2½ hours	11½ hours	10 hours	21 hours
(1) Tackletwill C	4 hours	20 hours	20 hours	34½ hours

der of abrasive resistance. The purpose of this table was not to make comparisons of fabrics with each other, but rather to evaluate the test methods.

Table III shows that the three tackletwills (Fabrics 10, 11, and 12) uniformly had the three highest ranks for abrasion resistance, with the heaviest in the best rank in eight of twelve tests. The fabric of lightest weight (Fabric 1) was consistently in the poorest abrasion—resistance rank throughout. The fabrics of intermediate weight were intermediate in rank between the two aforementioned extremes, although they maintained no consistent rank order position with respect to abrasion resistance as denoted by the percentage of strength loss for the four combinations of wheels and pressures. For this reason, it seems desirable for the same type of wheel and the same amount of pressure to be used for tests where fabric comparisons are to be made one with another.

TIME OF MAKING ABRASION TESTS WITH THE DIFFERENT COMBINATIONS OF WHEELS AND PRESSURES—An analysis was made of the time required for running four test specimens of each fabric to five or six cycle stations, the last being a 100 per cent strength loss. See Table IV.

In each case much less time was required for the test procedure using CS 10 wheels with 500 grams pressure than with the other combination. The tests required from 10 minutes with the blue satin to four hours with Tackletwills *A* and *C*, respectively with CS 10 wheels and a pressure of 500 grams. Time requirement for the CS 10 wheels with 250 grams pressure varied from 30 minutes to eight hours; for CS 8 wheels with 500 grams pressure, from 20 minutes to 20 hours; and for CS 8 wheels with 250 grams pressure, from one and one-fourth hour to 34.5 hours.

From the laboratory standpoint, it would seem that the test procedure using CS 10 wheels and 500 grams pressure would be the only procedure that could be conducted in a period of time sufficiently short for practical purposes. It should be noted that these tests comprise only the time required for the actual running of the abrasion test, and do not include the time required for mounting the fabrics, changing the turntable, and carrying out the strength tests, much of which can be done with one test sample while another sample is undergoing the abrasion treatment, and therefore represents over-lapping.

COMBINATION SELECTED FOR FURTHER STUDY—

CS 10 wheels with 500 grams pressure made up the combination selected for all fabrics for further investigation of abrasion destruction. An exception occurred in the case of one satin fabric (Fabric 1) which reached a 100 per cent strength loss in less than 100 cycles. For this fabric CS 10 wheels with a 250 load pressure were selected. Since this type of fabric rarely will be met in an investigation of this type because of its very low abrasion resistance, this wheel-pressure selection was made for the following reasons:

(1) The time required for the test was much shorter;
(2) The wheels were less affected by clogging;
(3) The variation in test results as determined by standard deviation calculations, while not always the lowest of the four combinations, showed that satisfactorily constant results were obtained by this combination;
(4) The direction of greatest breakdown was the same with all combinations;
(5) Fabric breakdown as determined under low magnification appeared the same in all four combinations;
(6) The general ranking of the fabrics was the same generally with all combinations, although some differences were shown when close relationships existed.

SUMMARY

Using the three-wheel test procedure, four combinations of wheels and loads were studied in order to determine whether or not any one combination was suitable for use with a wide range of types of rayon fabrics, or whether or not various combinations of wheels and loads for different fabric types were necessary.

A combination of CS 10 calibrase wheels with a 500-gram load pressure was selected as the best combination for use in the further investigation of abrasion destruction. An exception occurred in the case of one satin fabric which reached a 100 per cent strength loss in less than 100 cycles. For this fabric, CS 10 wheels with a 250-gram load pressure were selected. Since this type of fabric has very low resistance to abrasion, however, the technique developed is regarded as generally applicable.

ACKNOWLEDGMENTS

The author is indebted to the American Viscose Corporation under whose sponsorship the study was made through a fellowship supported in the Ellen H. Richards Institute, School of Chemistry and Physics, The Pennsylvania State College. She also appreciates the facilities and courtesies extended to her by members of the Fabric Development Laboratory for conducting parts of this study in their laboratory in New York City.

The author, moreover, is grateful to Dr. Pauline Beery Mack, Director of the Ellen H. Richards Institute, The Pennsylvania State College, for her encouragement in the pursuit of this problem and to the Ellen H. Richards Institute for the provision of the physical means for undertaking this investigation.

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SAMPLING DEVICE FOR PRESSURIZED PACKAGE DYEING MACHINES*

P. M. COLE and T. W. STRICKLIN

E. I. du Pont de Nemours and Co., Wilmington, Delaware

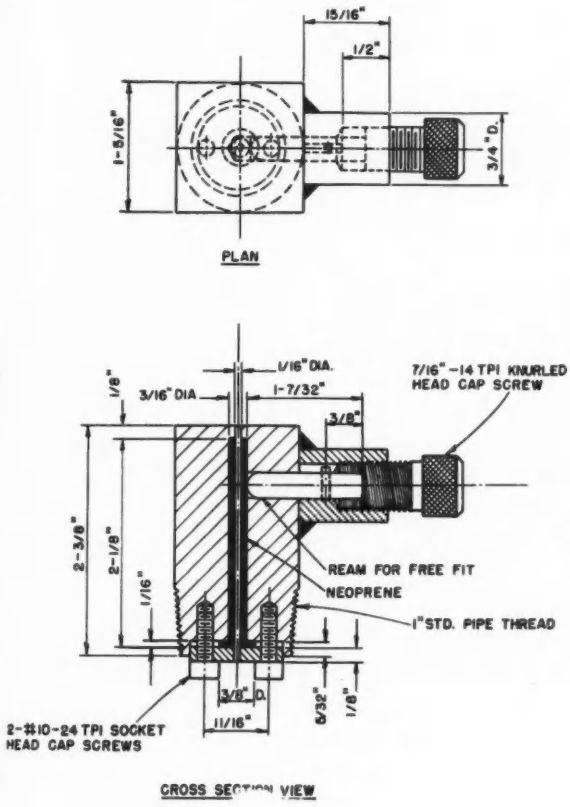

Figure 1

Figure 2

RECENT publications *(1) (2)* have pointed out the advantages of dyeing fibers at temperatures above 212°F. under pressure. This is particularly true of dyeing nylon and "ORLON"† acrylic fibers. Thus, nylon can be dyed at temperatures above 212°F. under pressure more rapidly with better penetration and transfer than at temperatures below 212°F. *(1)* Likewise, "ORLON" acrylic fiber can be dyed with much better color efficiency at 275°-295°F. than at 212°F. *(2)*.

For aqueous dyeing of yarn and thread under pressure, modified package dyeing machines are admirably suitable. For this reason several mills have recently made provisions for package dyeing nylon and other fibers under pressure at temperatures above that of boiling water. However, the sampling of yarn for the purpose of shade matching has remained a problem because the sampling port cannot be opened without excessive loss of heat and time when temperatures appreciably above 212°F. are in use.

One very simple solution to this problem is to thread the end of yarn from one package through a resilient constriction in the head or side wall of the vessel. The constricted opening is normally clamped tight against the yarn, but can be released slightly to permit free withdrawal of the yarn at time of sampling. U. S. Patent 2,420,537 describes a seal which could be used for this operation. A simple means of obtaining the same result is by the use of a screw pinch clamp on a neoprene tube projecting from a pipe plug installed in the cover of the dye vessel. A sketch of a device based on this principle is shown in Figure 1, while Figure 2 is a photograph of the device. It has been successfully used in the laboratory for sampling yarn under pressures as high as 50 p.s.i.g. with only a very slight amount of steam escaping.

REFERENCES

(1) Philadelphia Section, AATCC: *Am. Dyestuff Reptr.* 38, No. 1, 9 (1949).

(2) R. J. Thomas and P. L. Meunier, *Am. Dyestuff Reptr.* 38, No. 25, 925 (1949).

* Contribution No. 96 from Jackson Laboratory.

† Du Pont trade-mark to designate its acrylic fiber.

ABSTRACTS

Optical Bleaching Agents

H. Seiche, *Textil-Praxis* November 1949, 568.

The so-called "Blueing Agents" are known to add a blue tint to the original yellowish shade of the material so that a slight gray results, thus compensating the natural color of cellulosic or wool fibers. In contrast thereto the "optical bleaching agents" act by compensating *optically* this yellow shade by reflecting U. V. waves and transforming these invisible rays into visible blue light rays. The compounds used in optical bleaching methods have the character of "colorless dyes", i.e., they have to be substantive to textile fibers. They are hard to strip in some cases and are also resistant to oxidizing agents. Thus they can be applied in dyeing and finishing operations preceded by oxidizing bleaching. Their stability against reducing agents helps to improve white effects in reductive discharges. The author does not point at a special class of these optical bleaching products. (In German)—P.W.

Identification of Organic Dyestuffs by X-Ray Powder Diffraction

G. Susich, *Analytical Chemistry* 22, 425-30, March, 1950.

Though almost all commercial dyestuffs are crystalline in nature, the crystals are often not visible even through a microscope. It is known that crystalline materials in powder form give characteristic x-ray diffraction patterns made up of lines in certain positions and of varying intensities. From these lines, the spacing values for different planes of the crystal lattice can be calculated by means of the wave lengths of the radiation. Thus the powder pattern or the spacing values of the crystal lattice are a definite characteristic of any dyestuff.

The x-ray powder pattern is used for the identification of organic dyestuffs by comparison with standard samples. The technique is claimed to have high sensitivity, but some difficulties arise from polymorphism, and there are certain definite limitations; e.g., in some cases the crystallites of the substance may be too small or the crystal lattice may be distorted, resulting in a powder pattern whose lines are either diffused or too few in number to give an exact characteristic. Under such circumstances the x-ray method cannot be used, nor is it applicable for the few amorphous dyestuffs, such as some sulfur dyes, some complex dyes with chromium, and some mixtures. It is particularly valuable when only small samples are available for examination, when dealing with products which do not show a definite melting point, when the unknown substance melts at approximately the same temperature as other dyestuffs with which it may perhaps be identical, and when the determination of the mixed melting point fails to give a conclusive result.—W.H.C.

Dyeing Fabrics with Indanthrenes

Anon., *Das Deutsche Textilgewerbe* March, 1950, 115.

This article discusses the jig-, winch- and pad-dyeing processes for textile fabrics with Indanthrene dyes. Jig dyeing is used mostly. Generally two jigs are employed, working together, one for carrying out the dyeing process proper, the other for developing. The first jig is equipped with a pair of squeeze rolls. Delicate fabrics have to be processed on special jigs, operating without tension. The dyebath ratio is generally between 1: 3 to 7:10. The amounts of lye and hydrosulfite have to be considerably increased for dark shades. The bath ratio in dyeing sparingly soluble brands (e.g., Indanthrene Blue RSN) should not be less than 1:8; the dyestuff has to be added in small portions. Tightly woven fabrics such as inlets are better dyed by first applying low temperatures or by using the pigment pad method. In dyeing on the winch, the reel has to be placed as closely as possible to the surface of the bath to avoid premature oxidation. Addition of some tannic acid or a few drops of ammonia is suggested here. Pigment dyeing can also be accomplished by small modifications in winch dyeing. This operation is explained with some useful details.

The Intensifying Effect of Urea in Printing Textiles

R. Haller, *Melliand Textilber.* May, 1950, 349-351.

Although the fixing and intensifying effect of urea on direct and acid dyestuffs is well known, the theory of these reactions has never been completely elucidated. Several authors assumed that swelling, hygroscopic or hydrotropic properties of urea might be responsible, but actually no substances known for reactions of this type could be substituted for urea to attain a similar effect. The author tried some pure brands of the substantive Chlorantine series and proved that urea, being a typical nonelectrolyte, had no influence whatsoever in modifying the dyestuff's substance. The same is true for the behavior of dyeing vats which are in no way better solubilized by urea in the reduced state. Urea, having a notoriously strong swelling action on starch, was added to a printing paste containing direct dyes, and darker prints resulted. The same effect occurred in preparing goods with urea solution followed by direct color printing. This phenomenon does not appear as a specific effect of starch however, because other thickeners act the same way. Therefore, the next step consisted of applying dyestuff solutions, omitting any thickener. An intensifying action (Chlorantine Light Red 7B) was observed, especially after a steaming operation.

As to the fixing property of acid dyes, a great series of these products was investigated, some of them being well fixed, while others were not. A typical example of the first group is Brilliant Cyanine 6 B which shows distinctly increased fixation with increased amounts of urea. If starch strongly modified by urea were exclusively capable of giving this effect, a similar behavior of nonstarch thickeners observed with this dye cannot be in agreement with this hypothesis. The author concludes that a well founded theory can not yet be advanced but that apparently the disperse character of the dyestuff solution (colloid-disperse of the direct dyes dyes or partly molecular disperse of some acid dyes) could possibly give a clue. (In German)—P.W.

Some Effects of Yarn Irregularity in Dyeing and Finishing

R. G. Fargher, H. M. Taylor, and F. W. Thomas, *J. Textile Inst.* 41, P590-604, July, 1950.

In this paper the authors discuss only those irregularities introduced during spinning, which are the most frequent sources of complaints.

Variations in the weight of one of the component yarns in a fabric produce relatively thin and thick places, which may become very prominent after dyeing. The thin places are more accessible than the thick ones to all of the liquors used in processing; this applies particularly to desizing, mercerizing, and dyeing.

The effect of weight irregularity first becomes apparent during sizing, for the thicker, softer portions of a warp yarn are more easily penetrated by the size and take up more of it than the contrasted thinner, harder portions. The difference rarely causes trouble during weaving, but after desizing, the process which is the first stage of bleaching, more size tends to remain in the thicker portions of the yarn because more is present initially and access by the desizing agent is more difficult. The quantity of size remaining and its distribution between thick and thin places may affect appreciably the behavior of the cloth during dyeing and finishing.

Streakiness due to yarn irregularity or to variations in cloth structure is much more evident in blues or greens than in yellows or reds. The explanation rests partly on a property of the human eye and partly on the optical properties of the dyestuff.

Small variations in twist between yarns which are otherwise identical, or differences in the proportion of short fiber, may affect the behavior of a cloth during napping and its appearance afterwards. They are also observed in knitted fabrics, when they may cause barring.

The authors finally discuss "neppiness", caused either by the proportion of immature cotton in the raw material, by fuzzy fragments of seed coat, or by faulty processing (usually carding) of cotton which need not give rise to nep if correctly processed.—W.H.C.

Measurement of Dyeing Properties and Correlation with Orientation in Nylon Yarn

A. R. Munden and H. J. Palmer, *J. Textile Inst.* 41, P609-34, July, 1950.

There are three structural properties in "66" nylon which are known to influence the dyeing characteristics of nylon yarn under given dyebath conditions. These are:

(1) *Amine end group content.* An increase in amine end group content increases the dyeing rate of anionic and dispersed dyestuffs and the anionic dye uptake.

(2) *Degree of order or crystallinity.* An increase in degree of order decreases the dyeing rate.

(3) *Degree of orientation.* An increase in orientation decreases the dyeing rate.

The amine end groups are the sites of anionic type dyestuffs in nylon; fewer sites are therefore available in nylon than in cellulose, where the hydroxyl groups are the principal groups concerned. Because of their comparative scarcity, more rigorous control of amine end groups is required in nylon than of the hydroxyl groups in cellulose. Because of the smaller number of sites, the dyeing rate depends critically on the diffusion process, which in turn is a function of the molecular orientation and order. High orientation and a high state of order hinder the dyestuff molecule in its progress to a suitable site. Thus any minor physical differences in structure in the nylon have a large effect on the dyeing properties.

Knitted fabrics were made from yarn in which there were known short period differences in orientation. The tubes were then dyed with a range of dyestuffs selected from the usual classes of anionic dyestuffs and dispersed acetate dyestuffs. The prominence of the streaks caused by dyeing differences was judged visually. Three dyestuffs were then chosen which had a typical range of covering properties: Durazol Blue 2R, a direct cotton dye; Solway Blue B, an acid dye; and Duranol Brilliant Blue BN, an acetate dye. Durazol Blue 2R accentuates differences in dyeing caused by changes in orientation much more strongly than any other dyestuff tested.

The general plan was to investigate quantitatively the dyeing properties of the selected dyestuffs on "66" nylon yarn. Dyeing rates, equilibrium dye uptakes, and penetration rates were the dyeing characteristics chosen for study. Birefringence, change in length in phenol solution and phenol partition coefficient measurements were the measurements chosen for following physical differences in structure in the nylon. From the data thus accumulated it was proposed that a simple routine test based on reflectance measurements on knitted fabrics should be developed to detect changes in orientation in nylon yarn.—W.H.C.

Rapid Method for Determining Mildew Susceptibility of Materials and Disinfecting Activity of Compounds

R. G. H. Siu and G. R. Mandels, *Textile Research J.* 20, 516-18, July, 1950.

A simple method has been developed in the Quartermaster General Laboratories which minimizes the difficulties inherent in tests used currently for evaluation of resistance of materials to microorganisms. In many cases tests can be completed overnight. Furthermore, the same apparatus can be used for testing a variety of materials, such as cotton, wool, leather, and plastics.

The apparatus used, which is illustrated, is essentially a Barcroft differential manometer, connected to two Erlenmeyer flasks, each containing mineral-salts agar. In one of the flasks is placed a disk of fabric inoculated with mildew spores. The apparatus is then tightly sealed. During the growth of the organism it absorbs oxygen from the air in the flask, which causes a decrease in pressure, as indicated on the manometer. The carbon dioxide produced is absorbed by a wick of filter paper suspended in the flask, saturated with 10% caustic potash. Periodic readings are taken of the pressure changes in the manometers. These changes are used as the criterion of susceptibility to mildew.

The correlation between results obtained by this procedure and by the standard pure-culture technique is said to be excellent.—W.H.C.

Removal of Stains in Fabrics and Garments

A. S. Tweedie, *Canadian Textile J.* 67, 50-1, July 7, 1950.

This article presents particulars of the types of solvents, solutions, etc., and methods for use, for the removal of the variety of stains which may be acquired by garments during their manufacture.

Clear oil or grease may be removed from practically all fabrics by a solvent such as perchlorethylene. Dirty oil or grease can sometimes be removed by the same procedure, but in other cases it will require special treatments with spotting compounds, such as are used by dry cleaners, to lubricate the dirt particles and lift them out of the fabric. The spotting compound must be removed from the fabric later by further solvent treatment.

Beverage and food stains usually contain colored substances (fruit juices, tea, etc.). These require a treatment with water, with or without certain mild chemicals.

The author suggests that stain removal requires a perfect job (no rings, watermarks, etc.), and a carefully trained spotter is needed to remove all but the simplest stains. Such a spotter requires considerable special equipment to do his work properly. The author feels that clothing manufacturers would better turn over their stained garments to a high quality dry cleaner who has a good spotting department.

Wear Testing

D. L. C. Jackson, *Textile J. Australia* 25, 435-8, July, 1950.

The most satisfactory method of testing a garment for wear is to wear it. However, this usually takes a long time, and so a method is required by which the resistance to wear of a fabric may be assessed accurately, quickly, and with the use of a small quantity of the material.

The main factors which constitute wear are probably as follows: (1) Plane abrasion; (2) Edge abrasion; (3) Flex abrasion; (4) Force in tension, e.g., tearing; (5) Snagging; (6) Impact forces. Based on an examination of army combat uniforms, these mechanical factors can be divided approximately as follows: 30% plane abrasion, 20% edge abrasion, 20% flex abrasion, 20% tear, and 10% other actions. These proportions will vary for different materials and for different garments. For example, in the case of resin treated fabrics, edge abrasion, in connection with flexing and folding, is said to be the major factor in wear.

The author compares the merits of the various abrading surfaces in use: cloth, either the same as the sample to be tested or a standard cloth; mineral abrasives, e. g., carborundum and emery; and metals, either parallel spring steel blades, roughened flat metal surfaces, or wire gauze. He states that in general the properties required of an abradant are that it should not wear appreciably over a large number of tests; it should be uniform and reproducible; and the wearing action of the abradant should simulate closely the wearing action obtained in service.

The following machines are described: (1) Martindale Abrasion Machine; (2) T. B. L. "Ring-wear" Tester; (3) Taber Abraser; (4) Wyzenbeek Precision Wear Test Meter; (5) Schiefer Abrasion Testing Machine; (6) Stoll Abrasion Tester.—W.H.C.

Some Problems of Rayon Dyeing. Part VI. Cuprammonium Rayon

A. G. Tyler, *British Rayon & Silk J.* 27, 66-7, July, 1950.

Although regenerated cellulose rayons may be manufactured by both the viscose and cuprammonium processes, their affinities for dyes vary considerably. The greater affinity of the cuprammonium fiber may be partly due to its greater surface area (larger number of filaments in the yarn) and partly to the powerful swelling action of the cuprammonium solution used to dissolve the cellulose.

In dyeing with direct dyes, to obtain the most even results it is essential that dyestuffs of the same dyeing class shall be employed together, e.g., those which have maximum affinity at the same temperature. If a retarding and levelling agent is necessary, the author recommends the ethylene oxide fatty alcohol condensate ordinarily used with vat dyes for this purpose. Little or no electrolyte should be added to the dyebath.

Vat dyes may be applied satisfactorily, but precautions should be taken to counteract the rapid exhaustion. Raising the temperature of the dyebath is recommended, also the addition of retarding agents such as glue. For dyeing yarn in package form, the Abbot-Cox process is recommended (circulating the unreduced dye first, and later reducing it).

Dyeing light shades level with vat dyes is difficult at best; the leuco vat esters give better results owing to their lower affinity.

Azoic colors offer no great problem, if due allowance is made for the increased exhaustion of the naphthol bath. Basic dyes are applied on the usual tannin mordant, but pale shades are sometimes dyed on the unmordanted fiber, which has appreciable affinity for these dyes.—W.H.C.

Some Problems of Rayon Dyeing. Part VII. Protein Fibers

A. G. Tyler, *British Rayon & Silk J.* 27, 49-50, August, 1950.

Various proteins are, or have been, used for the production of fibers, the chief ones being those derived from casein, ground nuts, soya beans, zein (from corn gluten), and corn seed meal. In all cases the regenerated protein requires hardening after spinning and for this purpose the reagent which is invariably employed is formaldehyde. Without this treatment the wet strength is extremely low.

Any class of dyestuff which will dye wool will also dye the regenerated protein fibers, but the latter can absorb dyestuffs readily from cold, or almost cold, dyebaths, whereas wool has very low affinity for the majority of dyestuffs until the temperature of the dyebath approaches the boil. When these new fibers are dyed with wool dyes, which normally dye with sulfuric acid, this acid must be replaced by acetic or formic acid. The acid milling dyes are the only acid dyes recommended where wet fastness is required. Premetallized dyes, applied with ammonium sulfate, also possess good wet fastness. Mordant dyes may be applied by any of the methods used on wool, except that only organic acids are employed. Direct dyes may be used by a method similar to that used on wool. Vat dyeing is not permissible because the alkalinity of the bath would damage the fibers, but they may be dyed successfully with the leuco vat esters.

In dyeing any class of dyestuffs on regenerated protein fibers, the time of working in the boiling dyebath should be reduced to an absolute minimum owing to the tendency of the fibers to break down on prolonged boiling. This is particularly noticeable in the case of the fibers derived from casein. Also these protein fibers become plastic at high temperatures and are readily set into permanent creases if care is not taken in cooling the liquor after dyeing.

The author discusses briefly the dyeing of basified viscose staple, known as "Rayolanda", and alginate rayon.—W.H.C.

Synthetic Fibers: the Search for New Polymers. Polyamides Containing "Interrupting" Heterocyclic Groups

J. A. Somers, *British Rayon & Silk J.* 27, 43-4, 48. August, 1950.

Instead of forming polyamides having long straight chain molecules in which the amide groups (CO-NH) are separated by four or more methylene groups (CH_2) and also as straight chains, as in the production of nylon, it is possible to effect further separation of the amide groups by the introduction of "interrupting" atoms or atomic groupings. The introduction of oxygen or sulfur atoms was described in the June issue. This present article is concerned with progress which has been made in producing polyamides having heterocyclic groups. Considerable ingenuity has been shown in this field where the "interrupting" groups consist of carbon and nitrogen in closed rings and useful data have been secured concerning the way in which these groups affect fiber properties.

The purpose of introducing these new groups is not only to influence immediately the properties of the fibers, but also to produce cross links when the fibers are subjected to high temperature, thus obtaining increased stability.

The author gives details of several British patents which describe the production of polyamides containing various heterocyclic groups and their effect on the properties of the resulting fibers. As an example, if the 4-amino-1,2,4-triazole group is introduced as an "interruptor", the fibers are said to be remarkably resistant to boiling mineral acid.

It is stated that some of these new fibers can be made with a high degree of basicity, which in its turn can assist dyeing.—W.H.C.

Some Wool-Like Properties of Fibers and Fabrics. A Basic Study from an Engineering Viewpoint

J. J. Press, *Rayon & Synthetic Textiles* 31, 39-45, August, 1950.

The literature on certain wool-like properties of wool, casein, silk, acetate, viscose, strong viscose, cotton, nylon and Orlon fibers is reviewed. A basis is proposed for the definition and evaluation of common wool-like fabric qualities, such as roughness, bulk, bulk retention, warmth, resilience, crush resistance, hand,

drape, etc., by means of factors derived from measurable fiber properties. Two form factors are introduced as variables which govern the relative importance of each pertinent fiber factor in a given fabric. Examples are given to show the utility of the system in describing the character and behavior of wool-like materials. Fiber size, stiffness and resilience seem particularly significant. It is concluded that the type of information presented may form a preliminary basis for use in relating fiber properties to the quality of fabrics.

Twenty-five references to the literature are cited.

Cationic Softeners and Recent Improvements

A. S. Endler and F. Gruenwald, *Rayon & Synthetic Textiles* 31, 73-5, August, 1950.

In comparatively recent years the use of cationic surface-active agents as textile softeners has become widespread. Experience has shown that unlike the older types of products (sulfonated tallow, fatty emulsions, etc.) these compounds show an affinity for textile fibers, which imparts considerable wash resistance to the finish achieved. Moreover, in many cases the quality of the hand is considerably superior. The affinity of the cationics for textile fibers is believed to be due at least in part to electrostatic attraction, since fibers usually acquire a negative charge when in contact with water.

Two main difficulties attend the use of cationic softeners: first, discoloration of the softener on drying the goods, which shows up particularly on whites, and second, lowering of the light fastness of many dyes. In some cases the shade of the dye is badly affected. Both effects vary in intensity with the chemical structure of the cationic compound, and with the quality of the raw materials used in manufacturing it.

The chemistry of some of the cationic softeners and methods for producing them are described.

Fast Shades on Nylon Textiles

G. T. Douglas, *Canadian Textile J.* 67, 47-51, Sept. 29, 1950.

Nylon can be dyed with almost every range of dyestuff and it can be said that there is no more versatile fiber as far as "colorability" is concerned. For many purposes, such as lingerie and dress goods, in view of their excellent leveling properties, compatibility in admixture and their ability to cover yarn irregularities, dispersed acetate dyestuffs are eminently suitable.

The acid dyestuffs provide a comprehensive range of shades of superior wet fastness, and also yield generally brighter shades. The premetallized dyestuffs have good light fastness but do not build up well on nylon, while the shades are limited in their brightness. Direct dyestuffs, apart from a few which almost approach acid dyestuffs in structure, yield low color value or only tint nylon. Not one of these ranges is fast to repeated severe washing and to achieve this it is necessary to resort to chrome, vat and azoic dyestuffs.

Chrome dyes are difficult to chrome when using normal wool technique, partly because nylon is incapable of reducing dichromate anions to chromic cations, as wool does. This difficulty has been overcome by the simple expedient of introducing a reducing treatment after the chroming stage. A treatment with sodium thiosulfate, for example, will ensure maximum metallization of the dyestuff. Incidentally, chrome dyes are very much faster to wet treatments on nylon than they are on wool.

Nylon delustered with titanium dioxide is fairly rapidly degraded on exposure to sunlight. Experiments have shown that if nylon is treated with as little as 0.05% potassium dichromate and then reduced with sodium thiosulfate, the material is nearly four times as resistant to light as is untreated nylon. Chrome dyed material is also more resistant to light than untreated delustered nylon.

Copper complexes of the chrome dyes generally possess higher light fastness. By using sodium cuprochloride for the after-treatment, the copper anion is absorbed onto the end amino groups of the nylon, and readily combines with the dye.

To augment the range of fast-to-boiling chrome colors, it is necessary to employ selected vat dyestuffs. In general, the vat dyes yield low light fastness on nylon, as they are not aggregated to the crystalline state in which they are present when dyed on cellulosic fibers. An analysis of the results of daylight exposures shows that a definite correlation exists between the light fastness realized on nylon and the chemical constitution of the vat dyestuffs.

Azoic combinations cannot be applied to nylon by the normal techniques employed on cellulose. A modified method is suggested, consisting of simultaneous high temperature absorption of dispersed base and Brenthol (Naphthol) from a caustic alkaline solution, followed by cold diazotization and coupling *in situ*.

Incorporation of nylon into wool gives a material which possesses high resistance to abrasion and also added strength over that obtainable with wool alone. For fast shades, milling acid, premetallized and chrome dyestuffs provide the most suitable products for the dyeing of wool/nylon union materials. The dyeing of wool/nylon is complicated, because each dye has its own characteristic behavior.—W.H.C.

The Application of Cellulose Ethers to Textiles on a Laboratory Scale

N. Lakshminarayanaiah, *Papers Am. Assoc. Textile Technol.* 5, 173-90, September, 1950.

(This paper was the author's thesis for the degree of Master of Science at Lowell Textile Institute, and was winner of the recent technical papers contest of the A.A.T.T.).

The author first discusses the chemistry of the cellulose ethers, and the methods of manufacture of the various types (e.g., methyl and ethyl cellulose, hydroxyethylcellulose, and carboxymethylcellulose).

He states that because of the number of hydroxyl groups in a cellulose chain, a series of cellulose ethers with similar and also with different properties can be made by controlling: (1) the degree of substitution or the number of ether groups per glucose unit in the cellulose molecule; (2) the degree of polymerization or the molecular size of the ether.

According to the degree of substitution, cellulose ethers can be divided into three classes: (1) water soluble ethers; (2) alkali soluble ethers; (3) organic solvent soluble ethers.

In general, water soluble ethers are used as sizing and finishing agents and as thickeners for printing pastes. The sodium salt of carboxymethylcellulose is used in the textile field as an assistant for a great number of purposes.

The solvent soluble ethers are chiefly used as emulsions in plastics and lacquers. On the other hand, the alkali-soluble ethers, particularly hydroxyethylcellulose, are used in textile finishing to a very large extent. When textile fabrics are finished with these products, they are claimed to impart the following properties: durable linen-like finish, luxurious appearance, increased wear, retention of crispness and firmness after repeated washings, absence of linting, elimination of the need for starching after laundering, elimination of loss of weight in laundering and facilitation of shrinkage control.

These ethers have certain advantages over resins: (1) no need of curing; (2) increased strength and abrasion resistance; (3) no tendering due to chlorine retention; (4) prevention of slippage and fraying on nets, tobacco cloth, marquisettes and similar goods.

The author describes the application of several water-soluble and alkali-soluble cellulose ethers on cotton cloth, and presents tables showing the results of tests made on these various finishes for air permeability, tensile strength, stiffness, wrinkle recovery, abrasion and wash fastness.—W.H.C.

Wool and Wool-Like Rayons

A. Johnson, *Textile Mfr.* 76, 418-20, September, 1950.

The author reviews the properties of some of the wool-like rayons, and discusses the strong and weak points of each in relation to similar properties of wool.

The fiber produced from casein is comparable to wool in warmth and appearance and, in addition, is a much cheaper raw material for textiles. It has certain shortcomings, however, the most serious of which is a lack of elasticity and an extremely low wet strength; the strength of wet wool is approximately five times that of casein fiber in the same state.

Fibers made from peanut, soyabean, and fish protein also lack the strength of wool, but all of these, owing to their cheapness, are often mixed with it.

Nylon has great strength, one type being four times as strong as wool, and varying little whether in wet or dry state, and its toughness, expressed in figures, is 5 as compared with 2 for wool. A nylon filament twisted with a wool thread makes the latter far less susceptible to damage in weaving than a comparable all-wool yarn. Furthermore, the resultant fabric is much stronger, and is not inclined to shrink as much as an all-wool counterpart. The life of socks, underwear, suits and dresses made from nylon/wool yarn will be increased threefold without any deterioration in handle or appearance.

Nylon is much more durable than wool, and can also be crimped. It is very resistant to attack by acids and alkalis and other chemicals which adversely affect wool. On the other hand, there is one undoubted physical advantage which wool possesses over synthetics, and more especially nylon. This refers to its high heat of wetting, that is, the heat liberated by the wool fiber when it absorbs water. This property makes wool most useful as a clothing fiber especially in view of the amount of perspiration the fiber can hold without feeling damp.

The author discusses at some length the possibility of wool being entirely replaced by synthetic fibers in future.—W.H.C.

Hydroxyethylcellulose and Its Uses

W. E. Gloor, B. H. Mahlman, and R. D. Ullrich, *Ind. Eng. Chem.* 42, 2150-3, October, 1950.

A newly introduced variety of alkali-soluble hydroxyethylcellulose is described, and its solubility, resistance to precipitation, and compatibility properties are tabulated. Data are presented on its physical characteristics. A description is given of the pattern of end uses suggested by the literature, in the fields of filament, sheet, textile and paper finishing, and ink. Of these, the textile applications are of particular interest.

The literature on finishing textiles with alkali-soluble hydroxyethylcellulose is extensive; this use is among the earliest mentioned and is of some commercial importance today. During World War II large quantities of cotton netting were stabilized against dimensional change under tropical conditions by treatment with alkaline solutions of cellulose and its ethers, followed by coagulation and finishing.

The author cites numerous references to the literature covering specific uses for hydroxyethylcellulose in the treatment of textiles, as follows: Coatings; finishes and dressings; yarn sizes; book cloth coatings; filling open weaves; adhesives; tracing cloth; making cloth transparent; filling the back of pile fabric; and waterproofing fabrics.

An aqueous alkali solution containing 3.5 to 5% of hydroxyethylcellulose is said to impart a linen-like "hand" to cotton. The product may also be used as a thickener for textile printing, as a fixing agent for pigments and as a coating for artificial leather. Various other applications are mentioned.—W.H.C.

Book Reviews

Physico-Chemical Constants of Pure Organic Compounds

J. Timmermans, 693 pages. Elsevier Publishing Company, Inc., 215 Fourth Ave., New York 16, N. Y. 1950. $12.50.

This book represents a quarter century's labor by the International Bureau of Physico-Chemical Standards. The bureau has taken very strict precautions to include only that data which they feel is authentic. That is, a pure compound was used for measurements, and the measurement methods were above their predetermined level of minimum accuracy.—T.F.K.

Advanced Organic Chemistry

Reynold C. Fuson. 669 pages. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 1950. $8.00.

This book blends experimental facts with numerous correlations to place emphasis on the reactions of organic compounds. Theories, together with analogies, contrasts, and empirical rules are given to aid the student to remember the facts.

Professor Fuson has placed under one cover all the widely scattered basic theoretical and descriptive information which is essential to every graduate student. It is definitely a must for the graduate student and an invaluable aid for the research chemist.—T.F.K.

Rayon—The First Man-Made Fiber

Joseph Leeming, Chemical Publishing Co., Inc., New York, 1950. Illustrated, 203 pp, $5.75. Cloth bound 8⅝" x 8⅝".

Joseph Leeming, now with the United States Government and formerly with the American Viscose Corporation, has made a very descriptive review of the history of the development and manufacture of nitrate, cuprammonium, viscose and acetate rayons. Although this is a small book, it covers the early work, the expansion of the rayon industry through the early part of the century, through the two world wars, to the present day. Many little-known facts are brought to life.

The descriptions of the various rayon processes are clear and concise. Throughout the book the author shows how the rayons found uses which best fitted their properties and how new and better industrial, household and apparel fabrics resulted from some of the unique properties of these fibers. A brief chapter on fabrics points out some special effects which have been obtained by using rayon, alone or in blends—filament or staple.

A short section gives a brief account of testing rayon fabrics to assure consumer satisfaction.

The last chapter is a statistical account of the production of rayon throughout the world. A 33-page glossary of general textile terms is included at the end of the book.

RAYON is a contribution to the limited number of books on fibers. It is well illustrated, nontechnical, and was written mainly for the layman. However, anyone interested in fibers or fabrics will find this book well worth reading.—C.A.H.

Proceedings of the
American Association of Textile Chemists and Colorists

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NOVEMBER 27, 1950

A FURTHER GREAT STRIDE TOWARD INTERNATIONAL STANDARDIZATION OF FASTNESS TESTS FOR DYEINGS AND PRINTS*

AN APPEAL FOR CO-OPERATION

IT IS becoming increasingly more important and pressing to have standardized testing methods available for the textile and dyestuff industries, which have been urged (in their respective countries) to promote exports. It will therefore interest the (European) reader of this Journal *(Melliand Textilberichte)* to be informed with respect to the endeavors that are being put forth with standardization as the goal. In the first stages these efforts have been directed first of all to European standardization, in order, in a second great step, to reach the final goal of the international standardization of fastness tests and methods of evaluation. The significance, importance and extent of all this should be readily evident to everyone.

The work for such standardization was undertaken about three years ago in Switzerland under the auspices of the Schweizerischen Verbandes fur die Materialpruefungen der Technik, Kommission 25 Textilien (=S.V.M.T.25) and at the same time in France under the leadership of the Institut Textile de France (=I.T.F.). As a starting point for the work of both institutions, the procedures worked out and published by the German Fastness Commission (D.E.K.=Deutsche Echtheits-Kommission) before 1939 were taken and also the procedures worked out by the Fastness Commission of the Society of Dyers and Colourists (S.D.C.) and Imperial Chemical Industries (I.C.I.). These methods were revised in close collaboration with representatives of textile mills and were adapted to the needs of today's textile and dyestuff industries.

Thanks to frequent consultations and discussions, as well as to a common desire to reach practical results most quickly, differences of view were soon overcome. In this way it was possible for the French and Swiss Fastness Commissions to work out approximately 20 testing methods within a short time. Most of these have been published (see *Teintex* and *Textil-Rundschau)* and have therefore been available for the criticism and judgment of fellow experts in all countries.

Especial importance is to be ascribed to the fact that recently the reconstituted German Fastness Commission has also joined in our labors. It has given its approval to the results already achieved and is assisting energetically in the common task of completing the directions that still need clearing up. We are now ex-

* Reprinted with permission from *Melliand Textilberichte*, 31, 714 (1950), Translated by C. Z. Draves.

A LETTER TO THE FASTNESS COMMISSIONS OF SWITZERLAND AND FRANCE AND TO THE MELLIANDTEXTILBERICHTE

Gentlemen:

I am enclosing an English translation of the appeal from the Fastness Commissions of Switzerland and France for the International standardization of textile testing methods. Will you please give me permission by return air mail to publish this translation as soon as possible in the *Proceedings of the American Association of Textile Chemists and Colorists* in the *American Dyestuff Reporter*. The manuscript is already in the hands of the printer and only awaits your approval.

The idea of world standardization of fastness tests is very close to my heart, and I have already worked in that direction. As a technical man I even have the boldness to presume that textile chemists and colorists can agree sooner in their field than the peoples of the world can agree on difficult political questions.

In these endeavors it is not to be overlooked that we Americans have already display much interest in promoting universal standards and methods. Although I may speak only for myself, I am nevertheless certain that we on this continent too would gladly co-operate officially in this worthy project, especially the American Standards Association and the American Association of Textile Chemists and Colorists.

Respectfully,
CARL Z. DRAVES
AATCC Editor of Proceedings
and Member of Research Committee

CZD:MU

tending an appeal and an invitation to all fellow experts in those countries that, up to the present, have not been able to become familiar with these activities in the fastness field to give us their full co-operation. Such co-operation can probably be given most effectively through the offices of the respective associations of textile chemists and colorists or through a delegation of prominent experts from science and technology. We consider that the time has come to place our work and effort on a broader basis for discussion. In order to make such expression possible, a European meeting in Basle has been provided for. This will allow all of us to discuss the suggested methods and, where possible, to accept them.

All interested circles are heartily invited to this meeting, and it is already very apparent that the broadest possible representation will give us full co-operation because of the far-reaching importance of the discussion and of the conclusions that are to be reached.

Preparations for this gathering are being energetically pushed forward during the next month, and we shall not fail to publish more detailed information and also to issue direct invitations.

We request all organizations and persons who wish to participate in this work conference in Basle to get in touch with the organizers, that is, with one of the undersigned organizations. Complete agenda as well as the texts of the testing methods that are up for discussion will be forwarded to prospective participants a few weeks before the meeting.

Institute Textile de France
Subcommission for Color Fastness
Paris XVIe
Rue de la Faisanderie, 59

Schweiz. Verband fuer die
Materialpruefungen der Technik
Unterkommission
Farbechtheit
St. Gallen
Unterstrasse 11

ONE HUNDRED AND SEVENTY-THIRD COUNCIL MEETING

THE Council held its 173rd meeting in the Hotel Wentworth-by-the-Sea, Portsmouth, N. H., on Thursday morning, Sept. 28, 1950. Present were President C. Norris Rabold, presiding; Arthur W. Etchells and George O. Linberg, Vice Presidents; William R. Moorhouse, Treasurer; J. Robert Bonnar, Chairman of the Research Committee; William D. Appel, Carl Z. Draves, Henry F. Herrmann, Thomas R. Smith and P. J. Wood, Past Presidents; R. Gordon Fiddes, C. Wendall Lever and Frank J. O'Neil representing Northern New England; Edward J. Allard, Raymond W. Jacoby, Robert W. Joerger and George H. Wood representing Rhode Island; J. Edward Lynn representing Western New England; Charles W. Dorn, William A. Holst and Paul J. Luck representing New York; James Dixon, Richard B. Stehle, Percival Theel and Jackson A. Woodruff representing Philadelphia; Wyss L. Barker, A. Henry Gaede and Sumner H. Williams representing Piedmont; A. Kempton Haynes and Walter M. Scott representing Southeast; Joseph H. Jones representing Mid-West; Kenneth H. Barnard of the Convention Committee; Leonard S. Little of the President's Advisory Committee; W. George Parks of the Technical Program Committee; Albert E. Sampson, Assistant Treasurer; Harold W. Stiegler, Research Director; Charles W. Strong representing exhibit management for the New York convention of 1951; George L. Baxter, Patrick J. Kennedy, and Harold C. Chapin, Secretary.

The Secretary's report of the 172nd Council meeting and financial report of Sept. 21, and the Treasurer's report for the year ending Aug. 31, were accepted.

Mr. Moorhouse was reported elected an Honorary Member of the Association by the required unanimous letter ballot of the Council. He expressed appreciation of this honor, but deemed it improper to accept while still an active officer of the Association. It was ruled his whenever he should see fit to accept.

Mr. Bonnar's resignation as Chairman of the Research Committee and of the Executive Committee on Research, effective at the end of the year, was accepted with regret, and with gratitude for his years of service in these important offices.* Reporting on recent activities he stated that dresses which had undergone tests of the Washfastness Committee, in co-operation with commercial laundries, had recently been exhibited, by the Lowell staff, at a convention of the Home Economics Association attended by some 2500 people, and there were made the object of a questionnaire on acceptability to wearers. A statement on laundry practices, from the Association and the American Institute of Laundering jointly, had recently been mailed by the latter to each of its 6000 members. The Washfastness Committee is working on the considerable number of tests developed over several years, with view to correlating, combining and simplifying. In cooperation with the Atlas Electric Devices Co., intensive work on further development of the Fade-Ometer has been under way for about a year. A committee to develop tests for odor in resin treated fabrics is under consideration. Under sponsorship of the Research Committee, a program of vocational training, through a committee headed by P. J. Wood, is already under way. According to Mr. Wood, the first of a series of shop manuals by this committee, on dyehouse mathematics, will be ready for the printer at about the end of this year.

In further discussion of work at Lowell, Dr. Stiegler stated that the Accelerotor is

* See letter of resignation following this report.

now in the final stages of test and minor refinement, preliminary to manufacture in quantity. Inconel tubes and holders for the new accelerated washfastness test in the Launder-Ometer are now available from the Atlas Electric Devices Co. A new tentative flammability test method involving improvement in the test instrument, was under interlaboratory test. Reports on the salt project from Lehigh University and the Lawrence group, and on the Quartermaster O. D. 7 shade, were nearly ready for publication.

For the Convention Committee Mr. Barnard summarized results to date on the questionnaire mailed recently to Association members. An invitation from the Mid-West Section for a convention in Chicago, on October 15 to 17, 1953, was accepted. Mr. Barnard's motion for a convention in Atlantic City in 1954, under management of the new Convention Committee, was tabled until the next Council meeting.

Mr. Dorn reported engagement, by the New York Section, of Campbell-Fairbanks, Inc. to manage exhibits at the convention of October 17 to 19, 1951. It was hoped that these would not only help in defraying other expenses of the convention, but also yield something for the Research Fund of the Association. The New York Section's plan for a contest between student chapters at the convention was approved, and Mr. Kennedy was appointed Chairman of the committee to arrange it.

Dr. Parks reported on the Technical Program of the Portsmouth convention; and Frank O'Neil reported on the Intersectional Contest, operating under new rules, including incentive for early filing of papers through presentation in order of filing. Mr. O'Neil also spoke briefly on the Boston convention of November, 1952, and George Wood on the convention then in progress under his management.

A letter from Mr. Cady described progress on the new *Colour Index*, particularly on the contract with the Society of Dyers and Colourists, which the officers of the Association were authorized to sign as soon as the final details had the approval of the Steering Committee. Representing the Publication Committee, Professor Theel reported that more copies of *Analytical Methods* had been bound, and that work was progressing on the *Vat Dye Monograph*. Rules for the American Dyestuff Reporter Award had been published. The year books of 1950 had been mailed to all members of the dues year ending in October.

Speaking for the Publicity Committee, Mr. Luck reported a new file of photographs and biographical material covering various members of the Association.

Reporting for the Corporate Membership Committee, Mr. Linberg urged more general support of our research through sustaining memberships, and himself offered to furnish printed appeals for circulation to members with their bills for dues. This offer was accepted by the Council with thanks.

Mr. Etchells presented membership applications approved by his committee. Elected to Corporate membership was the Grayco Products Company of Mexico. Each of the following was elected to the class of membership specified, as thirty days following publication of application, providing no objection be received meanwhile by the Secretary.

SENIOR

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D. Andriacco
C. H. Angell
S. E. Auslander
H. H. Bailey
H. J. Barnett
C. J. Barriere
E. Bonardi
R. Borgstrom
L. J. Boxser
C. P. Briggs
A. Brunner
D. J. Christensen
N. V. Cirillo
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J. S. Cosgrove
P. B. Dalton
J. J. Derrig
T. K. Desai
E. F. Diggs
E. F. Dinneen
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J. C. Farrow
H. J. Ferguson
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T. G. Gates
R. A. Gogate
L. S. Graichen
O. Grimnes
J. D. Guthrie
D. Hamilton
B. L. Hathorne
J. Hoyt
D. J. Hugon
R. Hulme
S. G. Hunter
H. Hymes
W. A. Ingham
J. Jarek
G. A. Jeffreys
C. F. Jelinek
F. E. Jenkins
C. E. Johnson
F. E. Johnson
R. W. Keenan
B. R. Koenig
G. K. Lake
J. Leach
W. E. Leaman
J. G. Lecrone
A. Leitstein
J. W. Libby, Jr.
B. T. Lord
S. J. Lovit
E. L. Lueck
F. E. Lukens
R. E. Madden
J. P. Malik
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M. J. McCarthy
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D. F. Pallone
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J. L. Phillips
E. W. Pieplow
R. A. Posey
L. Proulx
P. W. Pursell
J. H. Quinn
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P. G. Robbins
E. M. Rogers
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F. Sjogren
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E. G. Snyder
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E. H. Summersgill
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H. G. Walz
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E. H. Wells
F. I. Winterstein
H. A. Wotring
C. E. Young

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G. J. Gunning, Jr.
W. M. Harris
M. Hochfeld
A. L. Lestage
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F. C. Mauri
R. Pepin
J. Sadow
W. G. Wright

TRANSFERRED FROM OTHER CLASSIFICATIONS TO SENIOR MEMBERSHIP

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I. F. Brilliant
J. A. Colburn
A. F. Cuplinskas
G. A. Farley
A. M. Frank
J. J. Gang
J. E. Hirn, Jr.
C. Nathanson
T. F. O'Brien, Jr.
R. E. Pemrick
C. R. Puliafico
N. I. Schneider
W. M. Staub
C. A. Thompson

Respectfully submitted,

H. C. CHAPIN, *Secretary*

SECRETARY'S FINANCIAL REPORT — SEPTEMBER 21, 1950

Received and transmitted to Treasurer	*Applications*	*Dues, regular & reinstate*	*Dues, Corporate & Sustaining*	*Miscellaneous*	*Totals*
Aug. 1, 1949 to May 31, 1950	$4,720.00	$37,968.50	$43,857.50	$25,780.92	$112,326.92
May 31, to July 31, 1950	519.00	114.00	25.00	2,241.49*	2,899.49
Totals in fiscal year ended July 31, 1950	5,239.00	38,082.50	43,882.50	28,022.41	115,226.41
August 1 to Sept. 21, 1950	306.00	71.50	200.00	1,591.30**	2,168.80
Leaving deposited by Treasurer with Secretary,					9,588.90
Miscellaneous items		*	**		
Dividends and interest		458.65	68.00		
Reporters and reprints		25.95	8.35		
Year books		154.70	141.50		
Crockmeters		524.00	196.00		
Crock cloth		253.43	167.75		
Moth cloth		140.00	101.50		
Water test apparatus		70.75	122.50		
Dyed standards		24.20	55.00		
Knitted tubing		35.00			
Gas fading units and royalties		1.00	34.15		
Buttons		4.00			
Color transfer charts		127.50	67.50		
Flammability tester royalties			24.00		
Analytical Methods		241.00	416.00		
Colour Index		30.00	90.00		
Multifiber cloth royalties			99.05		
Rain tester royalties		26.31			
Launder-Ometer royalties		125.00			
		2,241.49	1,591.30		

J. ROBERT BONNAR'S LETTER OF RESIGNATION

September 11, 1950

Mr. C. Norris Rabold
The Erwin Cotton Mills Co.
Cooleemee, North Carolina
Dear Norris:

Upon returning from vacation, I find your letter of September 7th concerning the fact that I will be on the Agenda of the Council Meeting at the Annual Convention.

This brings to my mind that I wanted to have confirmation of my various talks with you over the past six to eight months concerning the Chairmanship of the General Research Committee and Chairmanship of the Executive Committee on Research, which positions I now hold.

As I have told you, I have now been in this work for approximately twenty years, with the last ten being particularly active, being on the original committee some eight or nine years ago, which resulted in the formation of the Executive Committee on Research, being on the newly-formed E.C.R., then replacing Dr. Olney and Leonard Little as chairman of the respective committees and trying to do the best I could in carrying on the absolutely wonderful work which they did.

I felt that you would probably want to have this resignation in writing before the Council Meeting in Portsmouth and wish that you would accept this letter as such.

I am sure the giving up of this work will be almost the equivalent of losing a member of my family, but, on the other hand, think that in fairness to myself, my company and my family, I should take this step which I desired to do about two years ago and reluctantly agreed to keep a while. I furthermore feel that, irrespective of my own feelings, the Association, as far as research work is concerned, will probably benefit by having someone new with different ideas to carry on some of those things which I have tried to set up within the structure.

I would very much like, at this time, to be able to name the many people who have helped me in my various positions in association work, but this would easily run into several hundred names, and even then I would slight many by not including them in the list. Thus I shall have to try to do this at some later date on a personal basis. I sincerely appreciate the considerable help which I have always been given by the national officers and Council, as well as present and past members of the E.C.R. and Research Committee, together with many of those, personal and association, friendly helps from those in the background.

It goes without saying, of course, that I stand ready at all times to assist my successor and the association in any way I can.

Yours truly,
J. Robert Bonnar
Chairman, General Research Committee
Chairman, Executive Committee on Research

JRB:goc

Piedmont Section Report

THE Piedmont Section held its annual Charlotte Meeting Saturday, October 28. The Technical Session was held in the afternoon and was attended by approximately 200 members. The following two papers were given:

1. "Piece Goods from the Cutter's Viewpoint"—Lawson W. Turner, Jr. of N. and W. Industries, Lynchburg, Virginia. T. C. Whitsel, Chairman of the Technical Advisory Committee of the Southern Garments Association opened the discussion.
2. "Dyeing of Algosols on Hosiery"—Karl A. Bridges of the General Dyestuff Corporation, Charlotte, North Carolina.

The Research Committee held a meeting presided over by Dr. Jennings, the Research Director of Dan River Mills. Plans were discussed for conducting work on intersectional papers for next year and a report given of the work by Clemson College and N. C. State College of its progress in preparing for the student contest papers to be presented at the Spring Meeting in Raleigh. Professor Henry A. Rutherford was commended for his work in winning the intersectional paper contest.

The Banquet speaker was Robert C. Jackson, Executive Vice President of the American Cotton Manufacturers Institute, and he enumerated the problems facing our country in the rearmament program both from the cotton planter and cotton manufacturer's point of view. Approximately 275 members and guests attended the Banquet.

The Meeting was presided over by Robert H. Smith of High Point, the retiring Chairman, and he introduced the new officers who are as follows.

Chairman—Edwin A. Briggs
Vice-Chairman—Hobart Souther
Secretary—W. Chester Cobb
Treasurer—J. C. Whitt
Custodian—A. R. Thompson
Councilors—John B. Neely
Sumner H. Williams
Linton Reynolds
Henry A. Rutherford
Sectional Committee—J. L. Moore
Jack Jordan
William D. Livingston
W. Carl Wilcoxson

C. C. Cayce of General Dyestuff Corporation, Charlotte, N. C., was in charge of this meeting.

Respectfully submitted,
W. CHESTER COBB, *Secretary*

NNE and LTI Student Sections:

A METHOD OF MEASURING PENETRATION AND WETTING*

CHARLES R. TROMMER

Graduate Student at Lowell Textile Institute†

The author describes an apparatus and an experimental technique by which he hopes to separate the phenomenon of the surface wetting of textiles from the penetration of textiles by a wetting solution. The manner in which the rate of penetration of several layers of fabric by an aqueous solution is measured with the authors apparatus is illustrated with two concentrations of a single nonionic wetting agent.

By means of the new apparatus it is hoped that commercial penetrants can be evaluated for money value, that water repellency can be determined separately from air permeability, that with the electrical part of the apparatus a better endpoint can be obtained in the use of the AATCC rain tester, and that correlation between penetration of a dye assistant and penetration of a dye itself can be studied.

THE belief that a knowledge of penetration rates would be of value in many textile processes, especially those involving the scouring and dyeing of tightly packed yarns or fabrics, has led to a desire to study penetration apart from wetting. In the light of the many advertising claims that lump wetting and penetration together, it was felt that a test should be available to evaluate penetration alone so as to find out if there is correlation between penetration and wetting.

Penetration, for the purposes of this paper, is defined as the ability of a liquid to diffuse through and thoroughly to permeate a textile material, and is considered to be largely an action taking place beneath the surface. This is distinguished from *wetting,* which is considered to be composed of both surface spreading and penetration.

In order to demonstrate the fact that internal wetting need not take place concurrently with, or immediately after, surface wetting, a series of canvas-square tests *(1 and 2)* were run with samples of gray canvas. The canvas-square test measures the time that is required for one-inch squares of canvas to become wet-out and to sink when they are placed on the surface of a wetting solution. I should like to point out that in *most* cases the squares sink immediately after the surfact of the cloth has become wet. This would seem to indicate that surface and internal wetting occur almost simultaneously.

A number of very marked variations, however, from that normal behavior have been noted. Some wetting agents have been observed to give comparatively rapid surface wetting without causing the squares to sink promptly to the bottom; in these instances they remain suspended just below the surface for relatively extended periods of time before becoming wet enough to sink to the bottom. As an example, one product had a surface submersion time of 18 seconds and a sinking time of 300 seconds; other products showed similar results, though not to such a marked degree.

These tests were repeated at least ten times in each case to prove that these were not freakish values. No bubbles were observed clinging to the submerged squares, so that the explanation for the failure to sink to the bottom directly after surface wetting had taken place apparently is that the squares were not wet beyond the immediate surface and contained enough occluded air to provide the observed buoyancy.

The possibility that the chemical nature of the wetting agent caused the time lag between submersion and sinking is very real, but the products that demonstrated this effect included a variety of chemical types, such as alkylarylsulfonates, sulfonated esters, and amide condensation products. All the products tested showed this time lag only when tested in the presence of inorganic reagents, such as sodium hydroxide and sulfuric acid, and these same wetting agents acted normally under other conditions.

The assumption that the inorganic reagents were the main factors causing the lag is apparently sound, yet it does not alter the fact that a sharp measurable difference was obtained between the surface wetting time and the sinking time. Therefore, the difference between surface-wetting time and final sinking time might be represented as penetration time.

I should again like to point out that this lag was not universal, and was demonstrated to a measurable degree by only a relatively few products. It is obvious that the test just described is comparatively insensitive to small variations and should be used only as a qualitative test.

Any test to measure the rate of penetration of surface-active agents into textile materials should be simple to perform and should not involve any equipment not normally available in a textile laboratory. With these desired limitations in mind, the various wetting tests available were examined with a view toward some simple modification that would weight them more heavily in favor of penetration and minimize the effect of surface wetting.

Among the tests that were modified and tried were the Draves test *(3)* and the canvas-disc test *(4)* of Seyferth and Morgan. In each case the samples used were made by sewing squares of cloth together to form pads of various thicknesses. The purpose of these pads was to increase the internal area considerably with maintenance of a relatively constant outer surface. Experiments with these pads gave rather erratic results, and the sewing procedure failed to rule out capillary movement of the wetting solution between the stitches used to sew the layers together and into the center of the pad from the sides, rather than penetration through the outer layers to succeeding inner layers. This possible seepage through the sides introduced a variable, which was completely unknown and which would be very difficult to determine experimentally.

To measure rate of penetration properly, it was considered advisable to eliminate the unknown effect caused by possible side seepage and also the extra operation of sewing. The next method to be tried involved measuring the rate of pene-

* Presented before the Northern New England Section and the Lowell Textile Institute Student Chapter on April 21, 1950, at Lowell Textile Institute.

† Now with Atlas Color & Chemical Co., Boston, Mass.

tration of wetting agents through varying layers of fabrics without complete immersion of the samples.

A metal block with a hole through its center was used as a means of applying the wetting solution to a fixed surface area of the test cloth in such a manner that the solution could be controlled. The endpoint of the test was to be the instant that the wetting solution appeared on the bottom of the lowest layer of the cloth. This endpoint could be determined by noting the appearance (through the use of mirrors) of a sighting dye on the bottom of the lowest layer of cloth, but the possibility of different rates of penetration for the dye and the surface-active agent ruled this method out.

It was then decided to use the completion of an electric circuit and the subsequent lighting of an electric light bulb to mark the endpoint of the test. The method and apparatus based on this idea consisted of the following:

1. A 110-volt a.c. circuit containing a toggle switch, a 7½-watt electric light bulb, and two copper electrodes, which are mounted on a glass plate with ⅛" gap between them. The electrodes measure 4 x ⅞" and are 0.002" thick. They are bound to the glass plate by means of a water-insoluble isobutylmethacrylate polymer. (A diagram of the electric circuit was shown on the blackboard.)

2. Filter paper, which had been previously saturated with a 10% solution of sodium chloride and dried, is placed directly over the copper electrodes and the gap between them.

3. The desired number of layers of three-by-three-inch squares of cloth is placed directly over the filter paper. This size of cloth was chosen because it is slightly larger than the metal block that is used, and any seepage between the top layer of cloth and the block can be easily seen.

4. A steel block weighing 1670 grams and measuring 2½ x 2½ x 2⅜" with a ⅞" diameter hole drilled vertically through it is placed directly over the layers of cloth, care being exercised to center the block on the cloth squares, and to have the hole in the block centered over the gap between the electrodes.

5. The desired volume of the wetting solution (usually 10 milliliters) is contained in a volumetric pipet, which is held at a 45° angle with the delivery end pointing toward the inside wall of the metal block. This angle is necessary to avoid the effect of impact on the cloth. The toggle switch is turned to the on position and a stop watch is started at the instant the solution is permitted to flow.

6. When the test solution has penetrated through the layers of cloth and has wet the filter paper, the electrolyte (the dried sodium chloride) dissolves and permits current to flow across the gap between the electrodes, thereby lighting the electric light bulb. The stop watch is stopped at the instant the bulb becomes lit to its full intensity.

7. The gap between the electrodes and the electrodes themselves must be carefully dried before each test is run. A blotter is used to soak up the excess moisture, and the final drying is done with a clean and absorbent cotton cloth.

(Chung-Sheng Na then demonstrated the method on the actual apparatus. Chung-Sheng Na, who has a B.S. and an M.S. degree from Lowell, volunteered to help the author present this paper).

The cloth is an unbleached percale sheeting. Five layers of the cloth are used. The wetting agent is a typical nonionic surfactant. A series of tests were run to determine the degree of reproducibility that might be expected from this method. The standard error of the mean was calculated for each test, and an error of ± 1.5 seconds or less was considered to represent a high degree of reproducibility in view of the empirical nature of this test. As a matter of fact, errors of less than ± 1.0 second were usually obtained.

The series was run with 5 milliliters of test solution, and a standard error of ± 1.5 seconds or less was obtained at times of 60 seconds and under. Another series of tests was run with 10 milliliters of the same test solution that was used in the previous series, and the standard error was found to be ± 1.5 seconds or less at times up to approximately 90 seconds. The larger volume also reduced the test times by nearly 50%, thereby bringing lower concentrations of wetting agent within the more reproducible time ranges. Larger volumes of solution were difficult to handle, so that 10 milliliters was chosen as the standard volume in all cases, with the possible exception of very absorbent materials or very high wetting-agent concentrations. In such instances there was no significant difference in the results with either 5 or 10 milliliters of solution.

To distinguish penetration values clearly from spreading values, the following points were considered:

1. The solution on the top surface layer spreads over the area bounded by the hole in the block and a bit beyond because of the relatively large volume of solution that is on it. The first layer may therefore be considered to be influenced quite heavily by spreading. The layers below the top are pressed together rather tightly by the heavy metal block, which causes them to act as an inner mass in which the spreading effect is at a minimum and the penetration effect is at a maximum. These assumptions were borne out by the analysis of a number of 5-layer pads at the completion of penetration tests. When the pads were taken apart, the top layer was seen to be wet over a large surface area, while the lower layers were wet only in the area directly under the hole in the metal block. Since the first layer represents both spreading and penetration, and it is desired to obtain a penetration time free from spreading, it was decided that the test value obtained for a single layer should be subtracted from the test value for more than one layer, and this difference should represent total penetration time. If this total penetration time for all the layers except the top is divided by the number of layers below the top layer, a constant value should be obtained, which represents penetration per layer.

TABLE I
WETTING AND PENETRATION
10 ml. of Solution Containing 3 Grams of Nonionic Agent per Liter

m	5	3	2	1
t_m	15.2	9.1	5.9	2.3
t_{m-1}	12.9	6.8	3.6	—
t	3.2	3.4	3.6	—

avg. t = 3.4 seconds

The calculation of penetration time (t) in seconds for one layer of cloth is as follows:

m = total number of layers of cloth.
m-1 = no. of layers below top layer.
t_m = total test time in seconds.
t_t = seconds for both wetting and penetration of top layer.
$t_m - t_t$ = seconds for penetration of all layers below top.
$\frac{t_m - t_t}{m-1}$ = t seconds for penetration of one layer.
avg. t = average seconds for penetration of one layer

TABLE II
WETTING AND PENETRATION
10 ml. of Solution Containing 5 Grams of Nonionic Agent per Liter

m	5	3	2	1
t	1.9	2.9	2.3	—

avg. t = 2.4 seconds

As the average penetration time per layer varies with the concentration used, it is suggested that a concentration that gives a test time of 5 seconds with one layer be used for comparison purposes. Tests with one layer and with five layers should be sufficient to permit the determination of the relative penetrating ability of a wetting agent.

The apparatus is at present in a very crude form, but it will be refined when sufficient data has been obtained to permit a more complete appraisal of its applicability.

(Concluded on Page P830)

Wool Scouring Committee—

PROPOSED TENTATIVE TEST METHODS FOR EVALUATION OF CONTINUOUS SCOURING OF RAW GREASE WOOL

SCOPE

THIS specification covers a method for the laboratory evaluation of continuous wool scouring. It is adaptable to the comparison of detergents, builders, and other chemical factors in the scouring operation; and also to the study of mechanical and other control variables, such as temperature, the number of bowls, immersion time, etc.

A standard apparatus and set of operating conditions are specified for purposes of calibration. Beyond that, conditions and apparatus may be varied in accordance with the desires of the operator to study any particular system which may exist in his own plant.

The criterion for scouring effectiveness is the extent of grease removal. A rapid method of grease extraction is described as part of this specification.

APPARATUS

EQUIPMENT FOR SCOURING—The equipment is shown in Figure 1, which represents an illustrative setup. It is assembled from common laboratory apparatus as listed. The letters refer to the key in the photograph.

A. collector for squeeze-roll liquor and return to bowl (squeeze roll Lovell Model 32).

B. fresh water supply for rinse bowl.

C. constant level device, feeding water through E to rinse bowl.

D. pinch clamp for regulating rate of water feed to rinse bowl.

E. hose connecting constant level tank and rinse bowl.

F. overflow from rinse bowl to suint bowl.

G. hooks for supporting wool skeins.

H. handle for agitating skeins in scouring bowls.

J. sliding adjustment for immersion of skeins into bowls.

K. lines indicating water level of constant temperature baths surrounding scouring bowls.

Bowl 1—Suint bowl, stainless steel, capacity 3.3 liters (E & A catalog No. 2-581).

Bowl 2—Scouring bowl, same as above.

Bowl 3—Rinse bowl, with hole drilled at a level which permits a liquid content of 3 liters.

EQUIPMENT FOR EXTRACTING—Extraction is done by agitating the scoured and dried wool specimens in a piston and cylinder system while immersed in carbon tetrachloride. An aliquot sample of the carbon tetrachloride is then evaporated in a tared aluminum cup on an infrared drier to determine the grease residue. The apparatus is shown in Figure 2, which consists of the following specific items:

1. A brass cup and plunger constructed as shown in Figure 4.

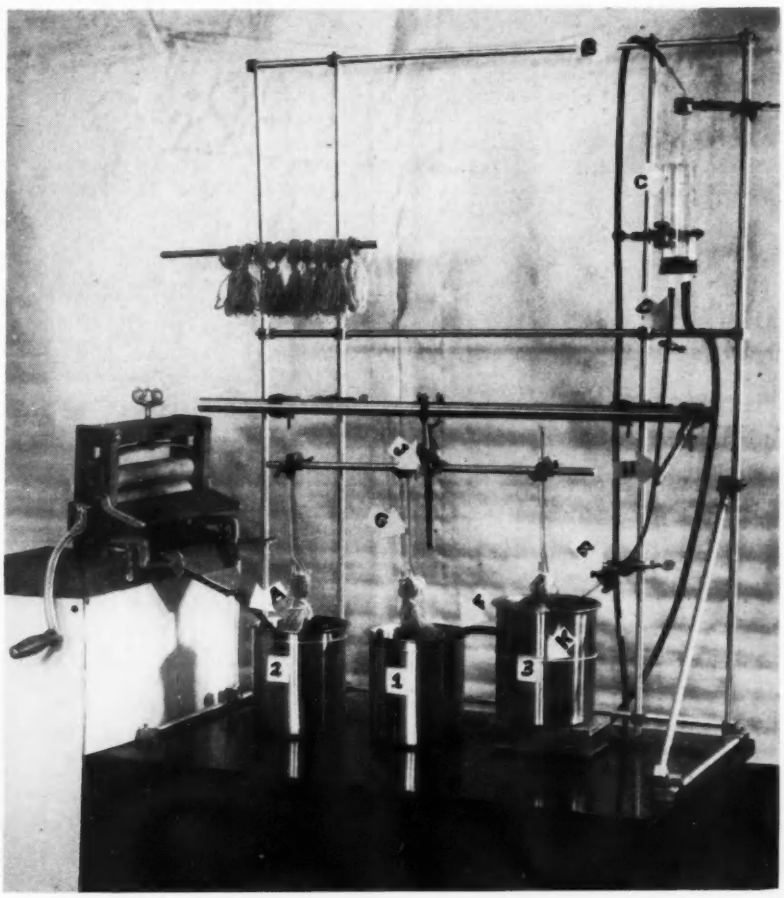


Figure 1

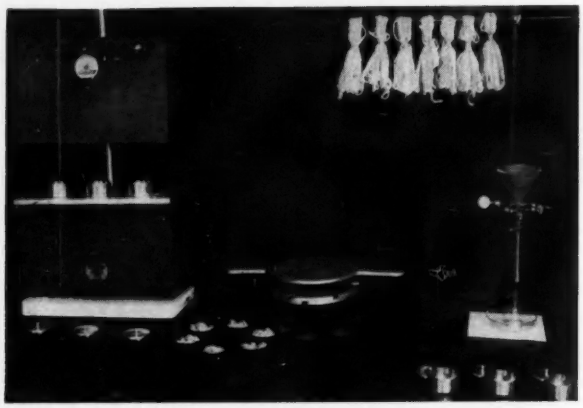


Figure 2

2. graduated glass cylinders to read 13 ml. and 29 ml.
3. small covered aluminum cups (Chemical Rubber Company, M-4992).
4. infra red drier (E. & A Catalog No. 11-504-5 or 11-504-10).

MATERIALS

Materials consist of a standard supply of grease wool in a uniform state of aggregation, a standard detergent and builder for purposes of calibration and reference standard, as follows:

A. *Grease wool*———a supply of grease wool carded and spun into a 3-ply yarn is available for purchase from the AATCC, Lowell, Massachusetts. A standard extraction curve for each lot of yarn showing residual grease content when scoured in the standard manner specified below is provided with each lot to assist in calibration of apparatus. This yarn contains only natural impurities, with no added spinning lubricants. This material is supplied in 1 pound lots, each pound in a sealed container. It should be stored in a cool place to avoid danger of changes in property due to aging effects.

B. *Standard detergent*———a supply of Olate Flakes (Proctor & Gamble) is standard reference detergent. A standard supply of this material is also maintained by the AATCC.

C. *Builder*———light soda ash is the standard reference builder. A standard supply is maintained at AATCC headquarters.

D. *Distilled water.*

E. *Carbon tetrachloride,* residue free.

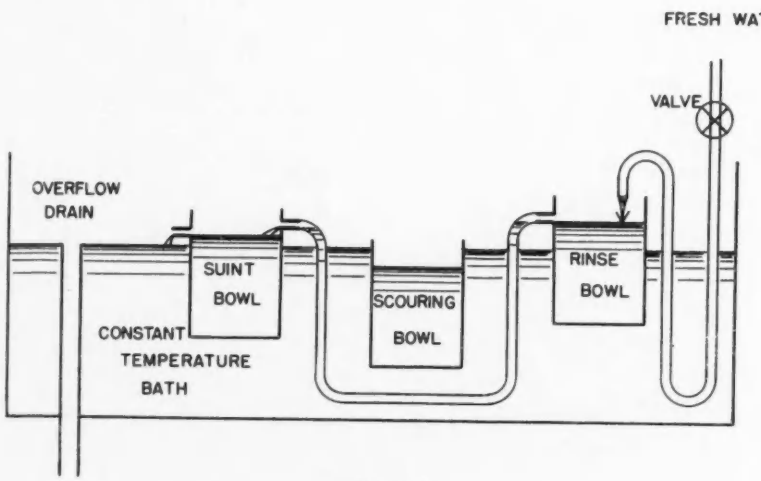


Figure 3

Connections for Feedback, Rinse Bowl to Suint Bowl

PREPARATION OF SPECIMENS

The grease wool yarn is prepared for scouring by winding into 5-gram skeins having a length of 6 inches, and with a knot loosely tied around the skein at a point 2 inches from one end. The 5-gram weighing is preferably, but not necessarily, made in a conditioned atmosphere. Twenty 5-gram specimens are required for a standard calibration test.

PROCEDURE FOR SCOURING

Connection of the bowls is illustrated in Figure 3. The conditions of the bowls at the start of the test shall be as follows:

A. CONTENTS

1. *Suint bowl*———Fill to the brim with distilled water.
2. *Scour bowl*—Put in 2 liters of distilled water in which are dissolved 25.0 grams soda ash and 3.00 grams Olate Flakes.
3. *Rinse bowl*———Fill to the overflow level (3.0 liters) with distilled water.

B. OTHER CONDITIONS

1. *Temperature* ——— The constant temperature bath shall be adjusted to 140 plus or minus 2°F. Sufficient time shall be allowed for the liquid inside the bowls to reach equilibrium with the constant temperature bath before starting the test.
2. *Immersion Time of Wool Specimens*———Each specimen shall be immersed for 30 seconds in each bowl.
3. *Agitation* ——— While immersed, each specimen shall be agitated at the rate of 25 complete cycles back and forth during the 30-second immersion.
4. *Rate of fresh (distilled) water feed to Rinse Bowl*———Shall be adjusted to 50 ml. per minute.
5. *Squeeze Roll Pressure*———The set screw on the squeeze roll shall be adjusted to a point which will result in a residual moisture content of the wool specimens after squeezing of 70% to 80%, based on the conditioned yarn weight.

C. STEPS IN OPERATION

1. Prepare solutions and adjust the constant temperature bath as noted above.
2. Adjust the rate of fresh water feed to the rinse bowl. As noted in Figure 3, this feed should preferably be led through the constant temperature

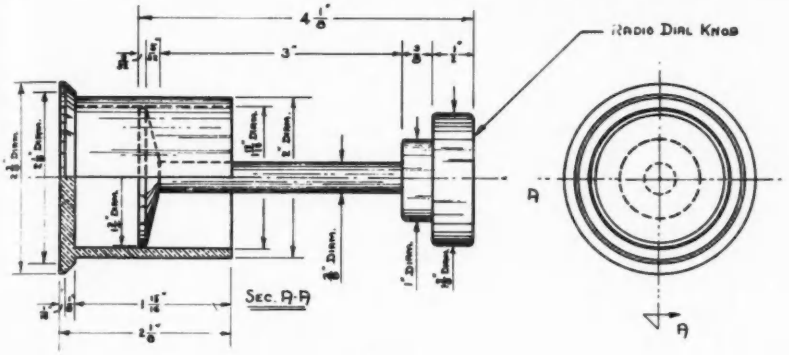


Figure 4

bath to reach temperature equilibrium so that it does not cool the rinse bowl.

3. Scour the grease yarn specimens in succession by immersion and agitation for 30 seconds each in bowls 1, 2, and 3 in that order. After each bowl the sample shall be put through the squeeze roll. The squeeze liquor from bowl 2 (scouring bowl) shall be returned to that bowl by means of the rubber hose attachment; the liquor from bowls 1 and 3 is allowed to flow into the sink.
4. Keep the scoured specimens in their order of scouring by aligning on a metal rod. When all of the specimens have been processed, dry them, still on the rod, for not less than 4 hours at 140°F. Then extract as follows.

PROCEDURE FOR EXTRACTION

(Extract in order of scouring)

1. Place each scoured and dried specimen into a brass extraction cylinder. Add 29 ml. of carbon tetrachloride.
2. Work wool in CCl_4 25 times by forcing CCl_4 through wool with the wide base of plunger. The cylinder is tilted at a 60° angle. The plunger is forced down and forward and back for each stroke. Allow to stand 4 minutes with plunger in position, then rework wool another 25 times.
3. Transfer extract into graduate by squeezing CCl_4 out of specimen and pouring off extract. Transfer 13 ml. of extract into covered aluminum evaporating dish. Evaporate excess solvent on infra-radiator. Cool to room temperature and weigh on an analytical balance. Difference in weight between dish plus residue and empty dish is the residue.

CALCULATION AND REPORTING

A. Calculation:—the residual grease in any one specimen is obtained by the following procedure:

$$\% \text{ Fat} = 44.6 \times \text{Wgt. of residue}$$

Note: 44.6 is a factor obtained by simplifying the following equation:

$$\% \text{ Fat} = \frac{\text{Wgt. of Residue} \times 100}{\text{Wgt. of Sample} \times 13/29}$$

B. Reporting:—plot a curve of residual grease content versus the cumulative grams of wool scoured. An illustration of this result is shown in Figure 5, in which 2 such curves are plotted. "Run 1" was made by initially setting conditions as specified above, and then at the 90 gram point, one-quarter of the original chemical charge was added. This improved the scouring again, and was repeated at the 180 and 270 gram levels, respectively, thus producing a saw-tooth curve.

By contrast, "Run 2" was made by continuously trickling an equivalent amount of detergent and builder over the entire range, which gave a straight line.

In similar manner, various detergents can be compared on an equal-cost-of-original-charge basis.

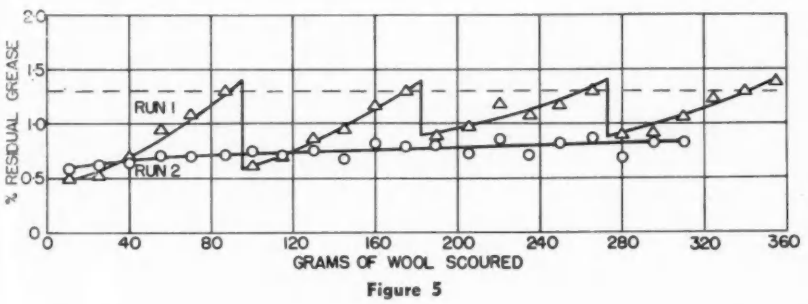


Figure 5

CALENDAR

GENERAL RESEARCH COMMITTEE

January 19, 1951 (Hotel Commodore, New York); April 20, 1951 (Raleigh, N. C.); June 15, 1951 (Hotel New Yorker, New York); October 18, 1951 (Hotel Statler, New York); November 16, 1951 (Hotel New Yorker, New York).

COUNCIL

January 19, 1951 (Hotel Commodore, New York); April 20, 1951 (Raleigh, N. C.); June 15, 1951 (Hotel New Yorker, New York); October 18, 1951 (Hotel Statler, New York); November 16, 1951 (Hotel New Yorker, New York).

NATIONAL CONVENTIONS

1951: October 17-18-19, Statler, New York.
1952: Boston.
1953: October 15-16-17, Chicago.

HUDSON-MOHAWK SECTION

Meetings: Dec. 8 (Albany), Jan. 19, 1951 (Albany), Mar. 16, 1951 (Albany), May 11, 1951 (Albany), June 22, 1951 (Annual Outing).

MID-WEST SECTION

Meetings: February 3, 1951 (Morrison Hotel, Chicago), May 5, 1951 (Hotel Schroeder, Milwaukee), June 16, 1951 (Outing, Lake Lawn Lodge, Delavan, Wis.).

NEW YORK SECTION

Meetings: Jan. 12, 1951 (Hotel New Yorker), Feb. 23, 1951 (Hotel New Yorker), March 30, 1951 (Swiss Chalet). May 4, 1951 (Swiss (Chalet), June 15, 1951 (Outing).

PHILADELPHIA SECTION

Meetings: December 8 (Kugler's Restaurant), January 12, 1951 (Kugler's Restaurant).

PUBLICATIONS COMMITTEE

January 18, 1951 (Hotel Commodore, New York).

RHODE ISLAND SECTION

Meeting: November 17 (Johnson's Commodore Room).

SOUTHEASTERN SECTION

Meeting: December 9 (Georgia Institute of Technology, Atlanta, Ga.).

WESTERN NEW ENGLAND SECTION

Meetings: Dec. 15 (Shelton), Jan. 26, 1951, March 16, 1951, May 4, 1951, June 23, 1951 (Outing).

Meeting-in-Miniature Report

A meeting of the Philadephia Section was held on Saturday, October 28th at the Philadelphia Textile Institute, School House Lane and Henry Ave., Germantown, Philadelphia. This meeting was planned in the form of a small local convention and therefore was called "A Meeting-in-Miniature".

The morning sessions consisted of three symposia on Wool, Cotton, and Hosiery with programs of each as follows:—

GROUP I—WOOL

Chairman—R. A. Shimp—E. I. duPont de Nemours & Co., Inc.; "Piece Goods Dyeing"—A. F. Felgendreger, Continental Mills, Inc.; "Chemical Processes"—Dr. Milton Harris, Harris Research Laboratories; "Stock & Yarn Dyeing"—H. E. Millson, Calco Chemical Div.

GROUP II—COTTON

Chairman — Heyward F. Lawton, Rohm & Haas Co.; "Chemical Processes of Cotton Fabrics including Bleaching" —Dr. Walter M. Scott, Dept. of Agriculture and Industrial Chemistry; "Vat Dyeing on Cotton Piece Goods"—Edward H. Gamble, E. I. duPont de Nemours & Co., Inc.; "Finishing," R. H. Drukker, Resin Dept. American Cyanamid Co.

GROUP III—HOSIERY

Chairman—V. T. Hartquist, Jefferies Dyeing Wks.; "Spun Yarn Preparation —Wool, Nylon and Cotton"—Ira Schwartz, Nathan Schwartz Sons; "Dyeing of Ladies' Full Fashioned Hosiery" John Koch, Jr., Artcraft Hosiery Sales Corp.; "Dyeing of Men's and Children's Hosiery"—W. G. Knerr, Liberty Dye Wks., Inc.

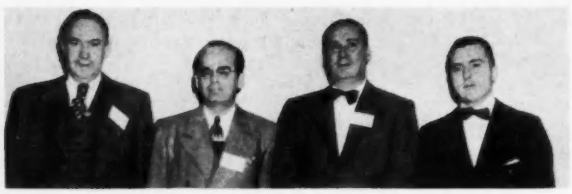
Before and after the morning sessions, special tours of the school were conducted by guides recruited from students of P.T.I.

A luncheon was served in the P.T.I. Cafeteria and, following this, the regular Section Meeting was held with Richard B. Stehle presiding as Chairman of the Philadelphia Section. During this, George Linberg and A. W. Etchells, National Vice-Chairmen were introduced as guests.

The Nominating Committee under the Chairmanship of Walter F. Fancourt, 3rd, reported their selection of Officers for 1951 as follows:—

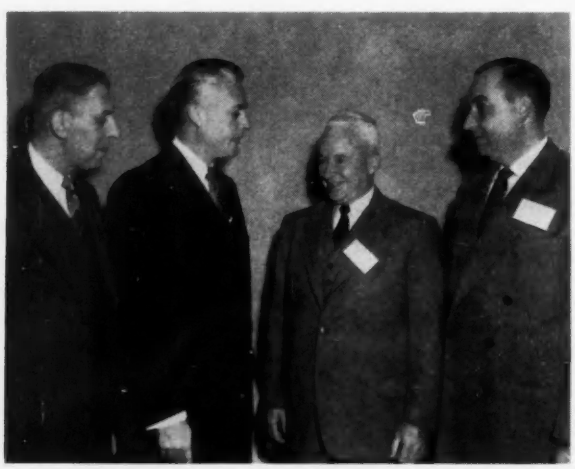
Chairman Emeritus—E. C. Bertolet, Temple University, *Chairman*—A. E. Raimo, John Campbell & Co., *Vice-Chairman*—Edward C. Diehl, Ankokas Dyeing & Processing Co. *Secretary*—Thomas H. Hart, Hart Products Corp., *Treasurer*—Harry L. Morgan, James Lees & Sons.

Sectional Committee:—E. E. Rettberg, Jr.—Scholler Bros., Inc., Harry F. Clap-

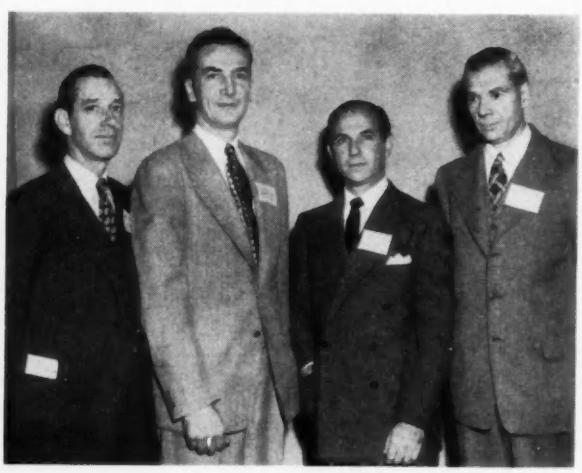


Synthetic Fibers Group—L. to R.—Dr. Hugh H. Mosher, Quaker Chemical Products Corp., **chairman**; David Cook, Quaker; A. W. Etchells, Hellwig Dyeing Corp.; Edward S. Pierce, H. W. Butterworth & Sons. A. C. Nuessle was not present when this photo was taken.

George O. Linberg, of Belle Chemical Co., a national vice president, is shown a wood frame loom by Ange Raimo during a tour of PTI while the "meeting in miniature" was in progress. In the background is Thomas J. Scanlon, of Calco Chemical Div., publicity chairman of the section.



Members of the Cotton Symposium: (left to right) Heyward F. Lawton of Rohm & Haas Co., **chairman**; Bertrand W. Hayward, who read the papers prepared by Dr. Walter M. Scott, acting chief of the Bureau of Dept. of Agriculture and Chemistry; Edward H. Gamble, of duPont, and Raymond H. Drukker, American Cyanamid Co.



Wool Symposium: (left to right) Richard A. Shimp, duPont, **chairman**; Alfred F. Felgendreger, Continental Mills, Inc.; Dr. Milton Harris, Harris Research Laboratories, and Henry E. Millson, Calco Chemical Division.

ham—E. I. duPont de Nemours & Co., Inc., Prof. P. Theel—Phila. Textile Inst., Thomas J. Scanlon—Calco Chem. Div.

Councilors:—Frederick V. Traut—Globe Dye Wks., Jackson A. Woodruff—American Viscose Corp., M. H. Klein—Sandoz Chemical Wks., James Dixon—

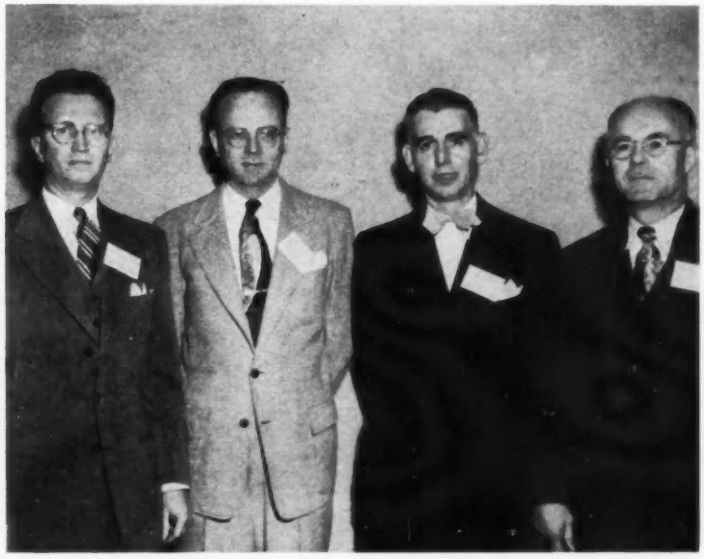
Morris H. Klein, **Co-Chairman** and A. C. Nuessle.

Bertrand W. Hayward receives an engraved plaque from Ernest E. Rettberg, Jr. Commemorating the presentation of the G. E. Spectrophotometer to P.T.I.

A. E. Raimo, John Campbell Co., **(right)** is congratulated by outgoing Philadelphia Section, AATCC, chairman Richard B. Stehle after Mr. Raimo was named chairman during the business meeting.

L. to R.—Thomas J. Scanlon, **Publicity;** Edward C. Diehl, **Treasurer;** Frederick V. Traut, **Luncheon;** Ange E. Raimo, **Registration;** and Thomas H. Hart, **Secretary.**

Harry L. Morgan, Meeting Chairman, presents Bertrand W. Hayward, PTI director with the Spectrophotometer. Standing by is Richard B. Stehle.



Hosiery Group—L. to R.—Virgil T. Hartquist, Jeffries Dyeing Works; **Chairman;** Ira Schwartz, Nathan Schwartz & Sons; John Koch, Jr., Artcraft Hosiery Mills, Inc.; and William G. Knerr, Liberty Dye Works, Inc.

Calco Chemical Div., Richard B. Stehle—Brehm & Stehle, Dr. S. Graham Turnbull—E. I. duPont de Nemours & Co., Inc.

Additional Nominations are possible by petition as described in the By-Laws of the Philadelphia Section.

Chairman Stehle appointed the following as Tellers of the Election:—

Harry Mc Candless, Venango Engineering Co.—*Chairman,* Charles Hagelgans, Jacques Wolf & Co., James Branegan, Kali Mfg. Co.

A General Electric Spectrophotometer was presented to P.T.I. by E. E. Rettberg, Jr., Scholler Bros., who was Vice-Chairman of the 1949 AATCC National Convention. This was accepted by Bertrand W. Hayward, Director of the Philadelphia Textile Institute. There followed a talk by Constantin J. Monego, Assistant Professor of Dyeing and Printing at P.T.I., on the "Use of the Spectrophotometer".

The afternoon session consisted of a symposium on Synthetic Fibers with a program as follows:—

GROUP IV—SYNTHETIC FIBERS

Chairman—Dr. Hugh H. Mosher, Quaker Chemical Products Corp.; "Preparation of Yarns"—David Cook, Quaker Chemical Products Corp.; "Dyeing of Fabrics"—A. W. Etchells, Hellwig Dyeing Corp.; "Chemical Finishing of Fabrics"—A. C. Nuessle, Rohm & Haas Co.; "Mechanical Aspects of Finishing of Fabrics"—Edward S. Pierce, H. W. Butterworth & Sons.

The Meeting-in-Miniature was attended by 323 members and guests.

Respectfully submitted,
THOMAS H. HART, *Secretary*

—♦ ♦—

Southeastern Section to Meet Dec. 9

THE Southeastern Section will hold its final meeting of the year in the Banquet Room at the Georgia Institute of Technology, Atlanta, Georgia, on Saturday, December 9th. Beginning at 6:30 P.M., the meeting will feature an address by Dr. R. F. Nickerson, Monsanto Chemical Company, on new developments in the application of resins to textiles.

—♦ ♦—

1951 Intersectional Contest

FRANK J. O'Neil, Chairman of the National Intersectional Contest Committee, is urging the local sections to form their committees early for the preparation of papers for next year's contest. Following is the letter which has gone to section chairmen:

"Those of you who were at the Saturday night meeting of the AATCC at Wentworth-by-the-Sea will recall my comments regarding the 1951 National Intersectional Contest. To refresh your memory, I stated that it was now time to form the local section intersectional contest committees for the coming year. In fact, not only should these committees be formed immediately but a subject should be selected and some work done during the spring months in order that the hardship of carrying on throughout the summer months will not be necessary.

"It might be well to point out that the most successful paper need not be one which reports something of greatest importance. All that is really necessary is some one thought or experience which has a practical interest to chemists or colorists and which can be described without too much work on the part of local committee members.

"I would like to urge you again to act now in choosing your subject and putting your 1951 contest paper under way."

—♦ ♦—

Hudson-Mohawk Section Report

THE October meeting of the Hudson-Mohawk Section was held at the Hotel Utica, Utica, New York on Friday, October 20th. The speaker of the evening was Dr. Harold H. Webber, Director of the Experimental Station at the Lowell Textile Institute, Lowell, Massachusetts, who discussed the problem of stream pollution in the textile industry with particular emphasis on wool scouring wastes. His paper was concerned, for the most part, with the technical aspects of the problem; however, he touched briefly on the political, economic, and sociological implications.

Forty-seven members were present for the dinner. Eight members of the student chapter of the Utica Technical Institute heard the paper.

Respectfully submitted,
W. A. NELSON, *Secretary*

—♦ ♦—

Babey Heads Subcommittee on Fastness to Sea Water

MATTHEW J. BABEY of the Calco Chemical Division of the American Cyanamid Company has been named Chairman of a Subcommittee on Fastness to Sea Water. Mrs. Winifred N. Pardey of the General Dyestuff Company holds the post of Secretary of the Committee. The members are:

Robert C. Allison.....Geigy Company
Edward Artim...S. Augstein & Company
William F. Brommelsiek.....
Forstmann Woolen Company
Percy J. Fynn.....J. C. Penney Company
George Greendonner.....
Sandoz Chemical Works
John Ploubides.....
Pacific Mills, Worsted Division

The Committee, which recently met at the annual convention, has organized a program and it is expected that the work done will be conducted in the AATCC Perspir-Ometer. Experimental work will be done critically reviewing the present sea water test, after which recommendations will be made.

—♦ ♦—

Report of Utica Technical Institute Student Chapter

A MEETING of the Utica Technical Institute Student Chapter was held on the evening of October 26th in the school cafeteria, with Chairman Ernest Larrat presiding. Jack Lashinsky reported on the recent meeting of the Hudson-Mohawk Section, at which interest was expressed in the Student Chapter and offers of assistance were extended. Anthony Casseta welcomed the members of the freshman class present as guests, and described the benefits of membership. Lester R. Henry, Faculty Advisor, outlined the brief history of the Chapter, and introduced the guest speaker, Charles White, Acting Superintendent of Yarn Manufacturing in the Oneita Knitting Mills, and a member of the first class graduated from the Institute. After the meeting refreshments were served.

Respectfully submitted,
GEORGE AUMICK, *Secretary*

EMPLOYMENT REGISTER

This column is open for two insertions per year, per member, without charge. Blanks can be obtained from, and filed with, the Secretary of the Association, Lowell Textile Institute, Lowell, Mass. It is understood that these will be open to inspection by prospective employers who can obtain further information from the Secretary.

50-31

Education: Business administration and chemistry.

Experience: Supervision of textile chemistry and coloring laboratories.

Age 52, married; location immaterial.

11-13, 11-27

Random Shots
of
Portsmouth
Convention

*AATCC Sub-Committee**

LITERATURE SURVEY OF TEXTILE BLEACHING
PART II
BLEACHING – GENERAL CONSIDERATIONS AND MISCELLANEOUS PROCESSES

(Concluded from Nov. 13 Issue)

PROCESSES and APPARATUS

1. Apparatus For Steaming Textiles. George P. Vincent and Archie Louis Dubeau (to Mathieson Alkali Works, Inc.). U. S. 2,395,305. Feb. 19, 1946.

2. Apparatus For The Chemical Treatment of Textiles. Albert Mellor and Robert Martin (to Celanese Corp. of America). U. S. 2,392,939, Jan. 15, 1946.

3. Apparatus For Steaming Textiles. J. P. Vincent and A. L. Dubeau (to Mathieson Alkali Works). U. S. 2,395,305, February 19, 1946.

4. Drying Traveling Fabrics. Mary Dalglish, Margaret Callander, John Dalglish, and Kenneth S. Laurie. Brit. 567,259. Feb. 5, 1945. An app. is described which indicates and (or) controls the moisture content of a fabric travelling through a drying machine.

5. Apparatus For Treating Textile Articles With A Fluid Medium Under Pressure. Emil J. Berger and Howard W. Matthews. Brit. 568,946. April 27, 1945.

6. Weyrich, Paul: Das Farben und Bleichen der Textilfasern in Apparaten. 1937. Vested by Alien Property Custodian and reproduced by J. W. Edwards, Ann Arbor, Mich. 1944. 347 pp. $11.50.

American Assoc. of Textile Chemists and Colorists Yearbook, 1944. Vol. XXI. New York: Howes Pub. Co. 1945. 692 pp. $3.50. Reviewed in *Rayon* 26, 102 (1945).

Schultz' Farbstofftabellen. 7th ed. Revised by Ludwig Lehmann. 1931-39. Vested by Alien Property Custodian and reproduced by J. W. Edwards, Ann Arbor, Mich. 1944. 4 vols. $50.00.

7. Heat-Drier For Textiles. C. N. Poesl (to E. I. du Pont de Nemours & Co.). U. S. 2,346,186, April 11, 1944

8. Apparatus With An Open-Topped Kier, For Dyeing, Bleaching, Or Other Treatments Of Textile Materials Such As Yarn Packages. John M. Wood (to Franklin Process Co.) U. S. 2,314,962, March 30. Various structural, mech. and operative details.

9. The History Of The Modern Cotton Bleach. H. Baier and W. Hundt. *Melliand Textilber* 25, 349-51 (1944). Descriptive.

10. Apparatus For The Treatment Of Textile Fabrics With A Heating Medium Such As Steam. E. I. duPont de Nemours & Co. and Christian N. Poesl. Brit. 557,859, Dec. 8, 1943.

11. Steaming Textile Materials Such As Cotton Yarn. Hans Langen (vested in the Alien Property Custodian).

U. S. 2,297,230, Sept. 29. App. is described, and a process is employed which involves preheating, close to its b.p., a treating liquid consisting of formalin, Turkey-red oil and glycerol, introducing the preheated treating liquid into a steam current, and feeding the steam carrying the treating liquid to the textile material.

12. Bleaching According To Regulation *No. 7* Of The Coordinator For The German Textile Industry. G. Zum Tobel. *Zellwolle, Kunstseide, Seide* 47, 201-4 (1942); *Chem. Zentr.* 1942, II, 479. Regulations are given for the protection of the textile during the bleaching of cotton, staple rayon, rayon and its products. Applications of these regulations to different bleaching processes are described and tables show the compu. of the bleaching liquors.

13. Nickel, Monel And Inconel In Textile Bleaching Operations. Reprinted from Bulletin T-22, Development and Research Division, International Nickel Co. Inc. *Am. Dyestuff Reptr.* 31, 446-8, 460-2 (1942). The corrosion of bleaching equipment contg. nickel "Monel" and "Inconel" metals has been investigated. These substances are not recommended for continuous use with solutions of less than 0.3% of available chlorine. For use with H_2O_2 all three products are satisfactory for the bleaching operations, but "Monel" is not suitable for storing 100-vol. and 25-vol. peroxide. It is also necessary to take certain precautions with "Monel" when making bleach liquors from sodium peroxide and acid, in order to avoid corrosion and decomposition.

14. The Bleaching Of Piece Goods In The Cotton-Finishing Industry. F. H. Thies. *Klepzig's Textil.-Z.* 44, 656-8 (1941). A review and discussion. *Chem. Abstracts* 36, 5357 (1942).

15. Treating Textile Goods With Alkaline Solutions, As For Scouring. D. J. Campbell and F. L. Fennell (to E. I. du Pont de Nemours & Co.). U. S. 2,267,718, December 30, 1941. An arrangement of app. is described, and a method of treating textile goods with an alk. soln. which involves wetting the goods with an alk. soln. such as one contg. NaOH 1-4% and subjecting the wetted goods to the action of steam at a temp. not higher than substantially the atm. boiling temp. of water whereby the goods are rapidly heated, and thereafter maintaining the goods at a temp. of about 120-200°F. both out of contact with the main body of alk. soln. and substantially out of contact with steam for a time during which the goods are acted upon by the aq. alk. soln. *Chem. Abstracts* 36, 2736 (1942).

16. Progress In Dyeing And Bleaching Textiles. Gordon-Abramou. *Rev. Gen. Mat. Color.* 44, 125-7 (1940). A resume of patents issued during the past year. *Chem. Abstracts* 34, 5664 (1940).

17. A New Process For The Boiling Off Of Cotton Materials With A Reduced Amount Of Alkali. G. Herman. *Sherstyanoe Delo* 19, No. 9-10, 14-15 (1940). *Chem. Zentr.* 9141, I, 2061-2. The essential feature of the process is the treatment of the raw fabric with a hot, mineral acid soln. of contact (sulfonaphthenic acid) which removes size and partially frees the material from substances contg. pectin, N, fat and wax. Three modifications of the process are described.

18. Fluid Treatments Of Textile Materials, As In Dyeing Or Bleaching. Jakob Schlumpf (to Atlantic Rayon Corp.). U. S. 2,163,634, June 27. App. is described and a method which comprises immersing the material

in the treating fluid so that it is free to float therein and subjecting it to simultaneous impingement by opposite jets of the fluid directed toward each other to sep. and open the individual strands to effect penetration. *Chem. Abstracts* 1939).

19. Recent Developments In Textile Bleaching. G. S. Ranshaw. *Chem. Age.* (London) 40, 57-8 (1939). *Chem. Abstracts* 1939).

20. A Survey Of (Cotton) Warp (Bleaching And) Dyeing Practice. H. I. Creslow. *Dyer* 81, 111-13, 159-60, 207-8, 255-7, 301-3, 347-9, 385-7, 428, 429-30, 477-8 (1939). (*Chem. Abstracts* 1939).

21. The Processing Of Acetate And Viscose Rayon Fabrics. VI. The Bleaching And Dyeing Operations For Acetate Flat Goods. C. B. Ordway. *Am. Dyestuff Reptr.* 28, 382-4, 39709 (1939). Six standard procedures are outlined. VII. The finishing of acetate rayon flat goods. Ibid. 57708, P599, 600-1—The routing of acetate rayon flat greige to finished fabric is indicated also finishing formulas as applied on quetch and a description of the Palmer tentering unit with operating suggestions. All goods should be given a final inspection under a northeast daylight as well as a specialized textile lighting arrangement. (*Chem. Abstracts* 1939).

22. Dyeing, Bleaching And Finishing. John W. Arrington. *Cotton* (Atlant) 102, 105-6 (Oct. 1938). (*Chem. Abstracts* 1939).

23. Bleaching, Dyeing And Finishing Light Cotton Down Material. E. Dutoit. *Teintex* 3, 543-8 (1938). Formulas and technique. (*Chem. Abstracts* 1939).

24. Bleaching Textiles. Imperial Chemical Industries Ltd. Fr. 832, 397, Sept. 26, 1938, See Brit. 489,496. (*Chem. Abstracts* 1939).

25. Quantitative Controls In Textile Finishing. II, R. E. Rupp. Cotton (Atlanta) 102. 102-4. Feb. 1938 cf. *Chem. Abstracts* 32, 1938.[4] The electrode-potential principle of measurement is described. An app. is shown in which a Cl soln. of 1 g./l. was controlled with a variation of less than = 0.01 g./l. A H_2SO_4 soln. contg. Na_2Cr2O_7 was controlled with an error of less than 1%. With sp. gr., elec., cond., electrode-potential measurements and continuous titrations, all of which can be made automatic, there are very few solns. in the textile industry that cannot be detd, automatically with greater accuracy than by any hand control. (*Chem. Abstracts* 1938).

26. The Acid-Resisting Steel In The Textile-Finishing Industry. Hans Hougardy. *Deut. Textilwirt.* 5, No. 4, 43-9 (1938) cf. *Chem. Abstracts* 6017.[2] Chem. and mechanical properties are described for steels of the compn. shown. (*Chem. Abstracts* 1938).

The effects of different dyeing, washing and alk.-treatment baths on welded Cr-Mo steel are tabulated.

27. Aluminum As A Construction Material In The Textile-Finishing Industry. W. Weiler. *Deut. Farber-Ztg.* 74, 27 (1938). Al is the only construction material which is completely resistant to neutral H_2O_2. Any possible corrosion of Al by slightly alk. H_2O_2 is prevented by the addn. of small amts of water glass. Al-Si alloys are of value for Cl bleaching operations. In dyeing plants Al can be used after the Na_2S-contg. dye liquors have been treated with min. amts. of water glass, which acts as a protective colloid. For acid dye baths the corrosion resistance is increased by slight addns. of naphthoquinoline, chromates, I, etc. App. made of Al can be used in mercerization if the alk. liquors contain small amts. of protective compds. such as water glass, glue and agar-agar. Al is not well suited for app. used for washing wool as it is attacked by wool sweat. For chem, Drycleaning plants the use of Al-Si alloys is recommended. (*Chem. Abstracts* 1938).

28. Corrosion - Resistant Materials Of Construction For Implements Used In Bleaching. R. W. Muller. *Melliand-Textilber* 19, 921-2 (1938). *Chem. Abstracts* 1939). Extended experience has shown that Ni or monel is suitable for handling H_2O_2 solns. and that monel is suitable for hypochlorite solns. contg. less than 3 g. active Cl per l. Hastelloy C is recommended for more concd. soln. of the latter.

29. Uses Of Stainless Steel On Textile Equipment. George W. Hinkle, *Cotton* (Atlanta) 102, 72-4 (Apro., 1938). Stainless steel has almost entirely replaced the wooden dye tub. Tests on the effect of stainless steel alloys on the rate of decompn. of peroxide bleach baths are very favorable, as are those on hypochlorite bleaches. The metal is entirely resistant to corrosion from these baths during the period of bleach, but standing baths of hypochlorite are not recommended in stainless-steel equipment. The 18-8-S-MO is recommended for Cl bleaching, while 18-8-S type is satisfactory for peroxide baths. Applications in kier boiling, steaming bobbins. etc., are mentioned. (*Chem. Abstracts* 1938).

30. The Bleaching Of Fibers, Particularly Of Wool. A. Foulon. *Deut. Wollen-Gewerbe* 70, 209-10 (1938). A review of chem. and mech. operations. (*Chem. Abstracts* 1938).

31. The History Of Bleaching. Andre Wahl. *Bull. Soc. Ind. Mulhouse* 104, 53-69 (1938). An address. (*Chem. Abstracts* 1938).

C	Cr.	Ni	Mo	Ti	Cb	Ta	Si	Cu
0.10	18	..	1.8	pres.	pres.	pres.	..	..
0.40	18	..	1.5	..	..	..	..	..
0.10	18	8	..	pres.	pres.	pres.	..	..
0.10	18	8	2.5	pres.	pres.	pres.	..	..
0.10	19	9	2.0	..	..	..	pres.	..
0.10	12	18	4.0	..	..	..	..	pres.

(pres. = Present)

32. Practical Hints On The Dyeing And Bleaching Of Acetate Rayon. G. Frische. *Deut. Wollen-Gewerbe* 70, 537-8 (1938). Chem. and mech. treatments are described. (*Chem. Abstracts* 1938).

33. Importance Of Method In The Textile Bleaching, Dyeing, Printing And Finishing Industry. John Muir. *Compt. Rend. 17me Congr. Chim. Ind.*, Paris, Sept.-Oct., 1937 252-9. A general discussion of the necessity of scientific methods and control. (*Chem. Abstracts* 1938).

34. The Evolution Of Bleaching Of Textile Fibers. E. Justin-Mueller. *Teintex* 2, 750-4 (1937); 3, 32-7, 85-8, 158-60 (1938). A detailed, documented history. (*Chem. Abstracts* 1938).

35. The History Of Bleaching. Andre Wahl. *Rev. Gen. Mat. Color.* 42, 304-9 (1938). (*Chem. Abstracts* 1938).

36. Notes On A Process Of Rapid Bleaching And The Procedure With Cotton Fabrics. P. Colomb. *Teintex* 3, 288-9 (1938). Formulas. (*Chem. Abstracts* 1938).

37. Staple Rayon. Ernest Kraus. *Wollen- & Leinen Ind.* 58, 122-3, 140-1, 160-2 (1938). A review of manuf., properties, chem. testing, microscopic differentiation, structure of the fiber, action of water, alkalies, acids and bleaching agents, desizing, dyeing and softening. (*Chem. Abstracts* 1938).

38. Recent Processes For Textile Bleaching. W. Weiler. *Chem.-Ztg.* 61, 961-2 (1937). Eighteen references. (*Chem. Abstracts* 1938).

39. Bleaching Of Jute. L. Bonnet. *Teintex* 2, 561-3 (1937). Review of technic. (*Chem. Abstracts* 1938).

40. Processing (Bleaching, Dyeing And Finishing) of Cuprammonium Rayon (Knitted) Hose And Fabric. Otto Muller. *Melliand Textilber.* 18, 84-5 (1937). Large-scale methods are described in detail and suitable dyes specified. A pre-treatment of cotton-cuprammonium, rayon mixt. materials in boiling aq. NaOH (0.7 g./l.) assists the production of equal depths of shade on both fibers in subsequent dyeing with direct dyes. (*Chem. Abstracts* 1938).

41. The Bleaching Of Textile Mixtures. Frische. *Deut. Wollen - Gewerbe* 69, 1038-9 (1937). Directions are given for the proper bleaching of mixed fabrics contg. rayon or staple rayon with cotton or wool. (*Chem. Abstracts* 1937).

42. Studies Of The Alkaline Treatment Of Cotton. L. Knollmann *Monatsh. Seide Kunstseide* 42, 269 (1937). An Address. (*Chem. Abstracts* 1937).

43. Evolution Of The Technic Of Bleaching Linen. L. Bonnet *Teintex* 2, 361-5 (1937). Historical. (*Chem. Abstracts* 1937).

44. Some Innovations In The Field Of Washing And Bleaching (Of Textiles). A. Foulon. *Deut. Wollen-Gewerbe* 69, 650-60 (1937). A Survey. (*Chem. Abstracts* 1937).

45. The Use Of Monel And Other Nickel Alloys For Bleaching. G. L. Cox and F. L. LaQue. *Am. Dyestuff Reptr.* 26, P127-32 (1937). The behavior of monel and other

nonferrous alloys in hypochlorite bleaching solns. is detd. principally by: (1) the concn. of available Cl, (2) the duration of each individual contact of the metal with the soln., (3) the condition of the metal surface, e.g., smoothness, and (4) the presence of corrosion inhibitors, e.g., Na silicate. Major factors which influence the stability of a peroxide-bleach bath are listed and a no. of instances of the successful use of monel in bleaching operations are illustrated and described. (*Chem. Abstracts* 1937).

46. The Suitability Of Stainless Steel Compared With Other Metals In Bleaching. Joseph E. Goodavage. *Am. Dyestuff Reptr.* 26, P71-7 (1937). A study was made of the effect upon the 1-vol. H_2O_2 soln. made alk. with Na silicate (pH approx. 10.0) when metals used in the textile industry are placed in contact with it. The tests are outlined and results tabulated. Conclusions: (1) The most economical metals for peroxide bleach baths are Ni, Al and Enduro 18-8S. (2) Ni and Enduro 18-8S are the most practical. (3) Corrosion, contamination of the bath with undesirable salts or ppts. or mech. fitness of the metals are not considered. (4) Stainless steel, soldered with Ag solder varies in its effects upon the peroxide bath. (5) Wool has a slight stabilizing effect upon alk. peroxide bleaching solns. (6) The tolerance limits of area-vol rations for several metals are: Cu 3 sq. cm./100 cc. Everdur and monel less than 4:100, each, and Al 8:100, and (7) Enduro 18-8S is almost as inert as porcelain or glass to peroxide bleaching solns. (*Chem. Abstracts* 1937).

47. Treating Textile Materials With Liquids. Joshua Wardle Ltd., Elvezio Bernasconi, Frank Dobbin and Wm. Charnock. Fr. 804, 787, Nov. 2, 1936. The action of the liquid (dyeing, bleaching, etc.) on the material is favored by the passage of an elec. current through the material being treated. App. is described. (*Chem. Abstracts* 1937).

48. Recent Developments In The Cotton-Bleaching And-Finishing Industries. J. Andrew Clark. *Am. Dyestuff Reptr.* 25, 648-9 (1936). A resume. (*Chem. Abstracts* 1937).

49. The Piece Bleaching Of Light Cotton Fabrics In Small Industrial Plants. W. Koch. *Wollen- & Leinen-Ind.* 56, 240-1 (1936). The mech. and chem. operations are described. (*Chem. Abstracts* 1937).

50. Progress In Textile Bleaching, Dyeing And Finishing. A. J. Hall. *Chem. Age* (London) 35, 555-6 (1936). *Chem. Abstracts* 1937).

51. Treatment Of Damasse Rayon. Josef Goebli. *Rusta-Rayonne* 11, 683-7 (1936). A brief description and discussion of the prepn. of the fabric, desizing, bleaching, dyeing and finishing. (*Chem. Abstracts* 1937).

52. Bleaching And Improving Mixed Fibers And Fabrics. H. Korte, E. Kayser and W. Waibel. *Melliand Textilber.* 17, 801-3, 864-5 (1936). Materials composed of cotton and staple rayon are considered. A no. of expts. were carried out; conditions and fiber proportions were varied. Results of tests on the product were given (*Chem. Abstracts* 1937).

53. Bleaching Vegetable Fibers. B. La porte Ltd. and Isaac E. Weber. Fr. 792,936, Jan. 13, 1936. See Brit. 434,599. (*Chem. Abstracts* 1936).

54. Treating Textile Materials With Liquids As In Washing, Dyeing, Bleaching, etc. Leon De R. Faber and Charles J. Carroll. U. S. 2,023,013, Dec. 3. Liquid is withdrawn from a pool (in a described appl.) and aerated, used for treating textile material and then returned to the pool. (*Chem. Abstracts* 1936).

55. Measurement Of Electrolyte Content Of Textiles. A. A. New. *Textile Mfr.* 61, 466-7, 508 (1935); cf. *Ibid.* 58, 69 (1932). The method has been developed more fully and successfully applied as a routine test for more than 2 years to all types of textiles used as insulation material. Details of the method, diagram of the app. used, and curves to det. the proper time of extn. for the sp. cond. and pH detn. are given. Five g. of textile material is extd. in 100 milliliters of H_2O for 1 hr. and a portion of the ext. is placed in a cond. cell and the resistance detd. The math. methods of calcg. the results are also given. The sp. cond. of the aq. exts. of the following materials, in micromhos at 25°, was found to be: unwashed grey cotton yarn or sheeting 500-1000, dyed cotton 50-200, wool-dyed and undyed 100-200, natural silk 50-200, acetate rayon 30-100, jute 100-300 and washed gray cotton yarn or sheeting 50-100.

56. Apparatus For Treating Textiles With Liquids. Juan Rabassa. Ger. 608,957, Feb. 4, 1935 (Cl. 8a. 18). (*Chem. Abstracts* 1935).

57. Bleaching Of Cotton Shirting Fabric. *Chem. Abstracts* 1935, p. 4950[2]. The Modern Cotton Shirting Fabric—An Account of its Processing Methods. A. J. Hall. *Am. Dyestuff Reptr.* 24, 265-8, 298-300 (1935).—The processing is divided into 3 stages: (1) bleaching which includes singeing, scouring and chemicking, (2) mercerizing, which includes mercerizing, scouring and soaping and (3) finishing, which includes drying, stentering and calendering.

58. Bleaching Of Textiles, Progress During 1934. *Chem. Abstracts* 1935, p. 5276.[5] *Textile Progress During* 1934. A. J. Hall, *Textile Colorist* 57, 111-13, 183-5 (1935).—"A review of the main developments in bleaching, dyeing, printing and finishing."

59. Bleaching, Research And Developments In, Technic. *Chem. Abstracts* 1935, p. 6766.[3] Recent Research and Developments in Bleaching Technic. A. H. Pettinger. *Textile Colorist* 57, 317-19 (1935).

60. Bleaching Of Textiles, Research On. *Chem. Abstracts* 1935, p. 6765. [8] Processing Research. Walter M. Scott, *Textile World* 85, 1268-9 (1935).—Textile research recently completed or in progress is reviewed under the headings: studies relating to bleaching, mercerizing, dyeing and finishing processes; fundamental and applied researches on cotton, wool, silk and rayon; new developments in connection with the analysis and testing of textile fibers: and instruments recently made available to the textile industry.

61. The Modern Cotton Shirting Fabric—An Account Of Its Processing Methods. A. J. Hall. *Am. Dyestuff Reptr.* 24, 265-8, 298-300 (1935). The processing is divided into 3 stages: (1) bleaching which includes singeing, scouring and chemicking, (2) mercerizing, which includes mercerizing, scouring and soaping and (3) finishing, which includes drying, stentering and calendering. (*Chem. Abstracts* 1935).

62. Processing Research. Walter M. Scott. *Textile World* 85, 1268-9 (1935). Textile research recently completed or in progress is reviewed under the headings: studies relating to bleaching, mercerizing, dyeing and finishing processes; fundamental and applied researches on cotton, wool, silk and rayon; new developments in connection with the analysis and testing of textile fibers; and instruments recently made available to the textile industry. (*Chem. Abstracts* 1935).

63. Recent Research And Developments In Bleaching Technic. A. H. Pettinger. *Textile Colorist* 57, 317-19 (1935). *Chem. Abstracts* 1935).

64. Kier Boiling. John Bothameley. *Textile Bull.* 46, No. 18, 6, 18 (1934). A discussion of the preparation of cotton piece goods prior to kier boiling and of kier boiling preparatory to Cl bleaching (*Chem. Abstracts* 1935).

65. Bleaching Of Textiles. *Chem. Abstracts* 1934, p. 7030.[2] New Method of Bleaching Textiles, W. Huesst and W. Krauer. *Tiba* 12, 579 (1934).— The process consists essentially in boiling the goods in a closed container with a suitable liquor, withdrawing the latter and steaming the goods without removing them from the container, and repeating the treatment if and as often as necessary.

66. Bleaching Of Cotton, Review On. *Chem. Abstracts* 1934, p. 6314.[9] Early History of Dyeing. J. Huebner, *J. Soc. Dyers Colourists*, Jubilee Issue 1884-1934, 1-6. A Review of Cotton Bleaching. W. Kershaw and F. L. Barrett *Ibid.* 90-8.

67. Bleaching Of Textiles. *Chem. Abstracts* 1933, p. 3346.[9] Bleaching Textile Materials such as Cotton or Rayon Cloth or Wool Yarn. Cyrus B. Wood. U. S. 1, 903,525, April 11. An aq. soln. of succinchloroimide is used.

68. Bleaching Of Cotton Piece Goods, etc. *Chem. Abstracts* 1933, p. 3339[6]. Practical Ideas in Processing Cotton, Rayon, Silk and Linen Piece Goods. A. C. Estev. *Textile Colorist* 55, 171-3, 267-9 (1933).—General. The water supply, effect of acids and other reagents on textile fibers, bleaching and dyeing processes and special mech. and chem. finishes are briefly discussed.

69. Bleaching Of Textiles, History Of. *Chem. Abstracts* 1933, p. 1760.[1] Notes on The History of Bleaching, Dyeing and Printing of Fabrics. A Bley. *Tiba* 10, 933-9, 1005-13 (1932): 11, 25-31 (1933).

70. Bleaching Of Textiles. *Chem. Abstracts* 1932, p. 2599.[8] Progress in Bleaching, Dyeing and Finishing. A. J. Hall. *Am. Dyestuff Reptr.* 21, 141-2, 175 (1932); cf. *Chem. Abstracts* 26, 1446.

71. Bleaching Of Textiles, Reviews On. *Chem. Abstracts* 1932, p. 1446.[9] Progress in Bleaching, Dyeing and Finishing. A. J. Hall. *Textile Recorder* 49, No. 586, 59-61 (1932).—A review of developments during 1931.

72. Bleaching Of Textiles, In Open Width. *Chem. Abstracts* 1932, p. 857.[1] Bleaching Fabrics in Open Width. Frederick Barker, Ernest Barker and Percy V. Barker. Ger. 534, 463, Apr. 17, 1930, See Brit. 332,718 (*Chem. Abstracts* 25, 421).

73. Bleaching Of Textile Materials. *Chem. Abstracts* 1932, p. 5433.[8] Kier Treatment of Textile Materials with Liquids Such as Dyeing or Bleaching Solutions. Thomas D. Ainslie (to Roessler and Haaslacher Chemical Co.). U. S. 1,868,513, July 26. Various details of app. and operation employing multiple streams of liquid under pump pressure in a circulating system are described.

74. Bleaching Of Textiles. *Chem. Abstracts* 1931, p. 421.[7] Bleaching and Other Treatments of Fabrics. F. Barker, E. Barker and P. V. Barker. Brit. 332, 718, July 3, 1929. The material is passed through kiers for liquid treatments while festooned in movable carriers over bars which may be formed of a steel alloy contg. C 0.35, Mn 0.25, Si 0.30, S 0.01, P 0.015, Ni 8 and Cr 18%. Various details of the app. are described.

75. Bleaching, Review On. *Chem. Abstracts* 1930, p. 1987.[2] Few Alterations in the Bleaching Process. S. R. Trotman. *Dyer, Calico Printer*, 62, 569-70 (1929).—A review.

76. Bleaching Of Textiles. *Chem. Abstracts* 1930, p. 2299.[6] The Mechanics of Bleaching and Finishing. D. G. Norton. *Textile Weekly* 4, No. 101, 632 (1930).

77. Bleaching, Of Cotton. *Chem. Abstracts* p. 522[4] 1929. The Control of the Bleaching of Cotton. S. R. Trotman. *Textile Recorder* 45, No. 540, 65, 67: No. 541, 57, 59; 46, No. 542, 67; No. 453, 61, 63; No. 545, 64 (1928).—The methods given in the literature for detg. copper number, methylene blue number and viscosity are critically reviewed and the relation of these properties to degree of oxidation is discussed.

78. Bleaching, Of Cotton Piece Goods. *Chem. Abstracts* 1929, p. 284.[8] Preparation for and Bleaching of Cotton Piece Goods. James Fitzgerald. *Textile Colorist* 50, 685-7 (1928).—A description of the procedures for singeing, steeping, boiling-off and bleaching. Recipes are given for kier liquors.

79. Bleaching, Review On. *Chem. Abstracts* 1929, p. 2297.[8] Process Trends in Dyeing, Bleaching and Finishing. Paul F. Haddock. A. Klipstein & Co. *Cotton* 93, 261-3 (1929).

80. Bleaching, Book, Pour Le Blanchisseur. *Chem. Abstracts* 1928, p. 3534.[2] Chaplet, A.: Pour le Blanchisseur. Formules, recettes, tours de Main (trues) methodes et procedes du practicien. Paris: Dunid. 176 pp.

81. Bleaching, Book Dyeing, Printing And Finishing For The Manchester Trade. *Chem. Abstracts* 1928, p. 3534.[2] McMyn, J. W., and Bardsley, J. W.: Bleaching, Dyeing, Printing and Finishing for the Manchester Trade. New York: Pitman. 238 pp. Cloth, $1.75.

82. Bleaching, Book Die Praxis Der, *Chem. Abstracts* 1928, p. 3784.[1] Ristenpart, E.: Die Praxis der Bleicherei. Berlin: Verlag von Krayn. Reviewed in *Tiba* 6, 845 (1928).

83. Bleaching, Book, Principles Of, And Finishing Of Cotton, *Chem. Abstracts*, 1928, p. 874.[6] Trotman, S. R., and Thorp, E. L.: Principles of Bleaching and Finishing of Cotton. 3rd ed. revised, enlarged, reset. London: Griffin & Co., Ltd. 688 pp. 30s.

84. Bleaching Of Terry Towels. *Chem. Abstracts* 1928, p. 1690.[4] Bleaching and Finishing of Terry Towels. H. D. Martin. *Textile Colorist* 50, 24-6 (1928).—Details of the various steps are given.

85. Bleaching, Of Cotton Piece Goods. *Chem. Abstracts* 1928, p. 1689.[4] Bleaching Cotton Piece Goods. J. T. Yates. *Am. Dyestuff Reptr.* 17, 195.

86. Bleaching, Of Cotton Goods. *Chem. Abstracts* 1927, p. 2192.[4] Bleaching Cotton Piece Goods. H. W. Ormond. *Am. Dyestuff Reptr.* 16, 312-4. — Practical directions are given.

87. Bleaching, Of Textiles, Review On, *Chem. Abstracts* 1927, p. 326.[4] Progress in Textile Bleaching and Dyeing. A. J. Hall. *Chem. Age* (London) 15, No. 385 (Dyestuffs Suppl.) 35-7 (1926).

88. Bleaching, Of Cotton, In Grey State. *Chem. Abstracts* 1927, p. 1360.[1] Cotton Bleaching in the Gray State. E. R. Trotman. *Can. Colorist Textile Processor* 7, 10, 16, 20 (1927).

89. Bleaching, Of Cotton. *Chem. Abstracts* 1927, p. 328.[1] The Bleaching of Cotton. J. Stephen Heuthwaite. *Dyer, Calico Printer* 55, 230-1 (1926); 56, 9 (1926). — The theory and practice are discussed.

90. Bleaching, Books. *Chem. Abstracts* 1927, p. 1714.[2] Chaplet, A.: Blanchiment. Paris: Gauthier-Villars, et Cie. 370 pp. Reviewed in *Chimie et Industrie* 17, 351 (1927).

91. Bleaching, Cotton-Rayon piece goods. *Chem. Abstracts* 1926, p. 3819.[5] Processing Cotton-Rayon Piece Goods. W. W. Chase. *Textile World* 70, 2016-8 (1926).— The scouring, bleaching and dyeing of cotton-rayon piece goods are discussed.

92. Bleaching, Book, Manuel de Blanchiment — Teinture. *Chem. Abstracts* 1926, p. 2078.[5] Liénard-Fievet, Ch.: Manuel de Blanchiment-Teinture. Paris: J. B. Bailliere & Fils. 400 pp. Fr. 18.

93. Bleaching, Book, The Dyeing And Chem. Technology Of Textile Fibers. *Chem. Abstracts* 1926, p. 1327.[8] Trotman, S. R., and Trotman, E. R. London: C. Griffin & Co., Ltd., 610 pp. 30s.

94. Cotton And Textile Finishing. Herbert A. Carter. *Can. Textile J.* 37, 90-1, 144-5, 168-9 (1920).—Practices, chemicals, and machinery used in finishing cotton, silk and wool are described.

95. Dyeing And Bleaching. A. Wioland. Brit. 146,945, June 17, 1920. App. for dyeing and bleaching vegetable and animal fibrous material wound in bobbin or roll form comprises a reservoir for the liquor, 2 vats having removable perforated tubes or beams on which the material is supported and treated, and a reversible rotary pump adapted to cause liquid to flow into either vat from the reservoir and from one vat to the other through the material. Means are provided for returning used liquor to the reservoir, for passing washing water through the material, for draining the tanks, and for maintaining the required temp.

Bleaching. G. Ornstein. Brit. 147,069, July 6, 1920. See U. S. 1,298,552 (*Chem. Abstracts* 13, 1770).

96. Apparatus For Dyeing Or Bleaching Textile Fabrics. H. M. Dudley. U. S. 1,331,743, Feb. 24, 1920.

97. Preliminary Boiling Process In The Bleaching Of Open Fabrics. E. W. Hunt. Brit. 145,113, Mar. 19, 1919. The material is plaited and compacted in full width in a chamber having fixed sides and movable ends, contained within an ordinary high-pressure kier and boiling the material under pressure. A suitable construction is specified.

98. Bleaching Textile Materials. A. E. Jury. U. S. 1,289,803, Dec. 31, 1918. In bleaching textile materials, the material is first treated with a bleaching substance and an inorg. acid, e.g., H_2SO_4 and $CaOCl_2$, then with an alk. soln. such as borax or Na_2CO_3, to neutralize the acid remaining in the material and finally with an org. acid such as HOAc to neutralize the excess alkali used.

99. Strong Chlorinated Bleaching Composition. K. P. McElroy. U. S. 1,261,572, April 2, 1918. A strong bleaching prepn. is formed by reacting upon H_2O with Cl at a temp. near 100° and passing the vapors into contact with caustic alkali.

100. Bleaching Apparatus. F. Donahue. U. S. 1,263,045, Apr. 16, 1918.

101. Apparatus For Dyeing And Bleaching. T. Allsop and W. W. Sibson. U. S., 1,245,139, Oct. 30, 1917.

102. Bleaching, Scouring And Decorticating Vegetable Fiber or Fabrics. A. Poulson. U. S. 1,254,727, Jan. 29, 1917. See Brit., 104,048 (*Chem. Abstracts* 11, 1911).

103. Dyeing and Bleaching Apparatus. T. Allsop and W. W. Sibson. U. S. 1,246,835-6. Nov. 20, 1917.

104. Details Of Bleaching And Finishing. Delmar. *Textile World J.* 52, No. (1917).—

105. Details Of Bleaching And Finishing. Delmar. *Textile World J.* 52, No. (1917); cf. *Chem. Abstracts* 11, 1550.—Processes of finishing bleached sheetings in cambrics, long cloth, ducks, drills, etc., are described in some detail. Fo sizings are included.

106. Apparatus For Bleaching Textile Fabrics in Long Pieces. C. Taylor, U. S. 1,201,388, Oct. 17.

107. Bleaching, Dyeing, etc. A. Ross. Brit., 14,086, Oct. 5, 1915. A bleaching or dyeing vat or the like is provided with an exterior siphon or circulation pipe for effecting circulation by withdrawing liquid from the upper level in the vat and returning it.

108. Chemical Tests In The Bleaching Process. Frederic Dannerth. *Textile World Record*, 34, 186.—The author gives methods for the control of the lime bleach on cotton goods. Detailed methods are given for the several determinations.

109. Apparatus For Dyeing, Bleaching, etc., Of Textiles With Circulating Bath. A. Peltzer. Ger., 294-308. Nov. 2, 1915. Addition to 256,117 (*Chem. Abstracts* 7, 2478).

110. The Ringenbach Kier. Alfons Keller. *Leipziger Farber-Ztg.* 59, 343-6.—A description of a patented bleaching apparatus.

111. Chemistry Of The Bleaching Of Cotton Cloth. John C. Hebden. *J. Ind. Eng. Chem.*, 6, 714-20.—Each part of the process used in American bleaching is discussed and analyses given of cloth from the various operations. Proteins are the cause of the yellowing of cloth during steaming rather than the fats and waxes.

112. General Principles Of The Bleaching Industries. F. J. G. Beltzer. *Rev. Chim. Ind.* 23, 85-9, 117-9.

113. General Principles Of The Bleaching Industries. F. J. G. Beltzer. *Rev. Chim. Ind.* 23, 147-52.

114. Dynamics Of Bleaching. S. H. Higgins. *J. Chem. Soc.*, 103, 1816-21.

115. Washing, Dyeing, Bleaching, Tanning. J. Heywood. Brit., 21,161. Oct. 19, 1914. An App. for washing clothes, textiles, crockery, and other articles, for dyeing, scouring, or bleaching, for tanning, or for otherwise treating articles with hot or cold liquids.

116. Brit., 8,365, Apr. 2, 1914. O. Lufft. Construction of an inter-communicating 2-compartment vat for dyeing, washing, bleaching, and otherwise treating textile goods with a circulating reversible flow of liquor.

117. Brit. 18,817. Aug. 19, 1913. O. Sumner and E. H. Sumner. In bleaching or dyeing textile materials such as cotton in various stages of manuf. fabric, or wood pulp or other cellulose fibers, the materials are subjected, in the presence of the treating-liquid, to a varying air pressure, the app. employed comprising 2 compartments adapted to be charged with both material and liquid, the liquid alternately rising and falling therein.

118. Fr. 467,887, Jan. 30, 1914. E. T. J. Watremez. Bleaching Vegetable Fibers. See U. S., 1,133,769 (*Chem. Abstracts* 9, 1935).

119. Apparatus For Handling Loose Fabric For Bleaching. Firma Fr. Gebauer. Ger., 292,000, May 15, 1914. The device is designed to convey the fabric under tension.

120. Apparatus For The Continuous Bleaching, Dyeing, Chlorinating, Acid-Treating, etc., Of fabrics in the strip. E. Ringenbach. Ger., 294,271. July 7, 1914.

121. U. S., 1,133,759. Mar. 30. O. Summer and E. H. Summer. Apparatus for Bleaching or Dyeing. Cf. *Chem. Abstracts* 9, 385.

122. U. S., 1,107,160. Aug. 11. J. Macadam. Apparatus for Bleaching and Scouring Fiber.

123. U. S., 1,077,263. Nov. 4. A. J. Dronsfield. Preparing Cotton for Dyeing or Bleaching by heating and forming into superimposed loosely compressed laps.

124. U. S., 1,062,245, May 20, 1913. W. Mathesius and M. Freiberger. Apparatus for bleaching cotton fabric in rope form.

125. U. S., 1,083,360, Jan. 6. C. W. Fulton. Apparatus for treating textile materials with bleaching solutions.

126. U. S., 1,095,028. Apr. 28. W. Resch. Dyeing and bleaching apparatus with a rotary drum for holding the material.

127. U. S., 1,061,392. May 13, 1913. W. Mathesius and M. Freiberger. Bleaching cotton goods in rope form by moving through a warm alk. bleaching soln. (e.g., $Ca(OCl)_2$) for 10-25 mins., rinsing in dil. $Ca(OCl)_2$ soln. so as to leave a small amt. of alk. soln. on the fabric and immediately passing it through an acid bleaching soln. for 10-25 min. to complete the bleaching.

128. Ger., 271,888, June 19, 1913. C. Obersen and L. Hwass. App. for dyeing, bleaching and otherwise wet-treating yarns.

129. Dyeing And Bleaching Textiles. J. F. Posselt. Ger., 286,208. Jan. 3, 1913. Means are provided for the periodic automatic interruption of the flow of the vat liquors.

130. Centrifugal Machine For Dyeing, Bleaching, Washing, Impregnating, And Nitrating Textiles. Gebr. Heine. Ger., 291,645, Aug. 29, 1913. The machine is elec. driven.

131. Brit. 9,247. Apr. 19, 1913. Chem. Werke v. Dr. H. Byk, F. L. Schmidt and R Grüter. Washing and bleaching. See *Chem. Abstracts*, 8, 2262.

132. Brit., 551, Jan. 8, 1913. J. Brandwood, et al. Constructional details of app. for dyeing, bleaching, and otherwise treating textile fibers and fabrics upon a perforated beam.

133. Brit., 25,822. Nov.. 11, 1912. Jaeggle, Erste Trautenauer Machinenfabrik Und Eisengiesserei. Construction and operation of a bleaching-apparatus.

134. U. S. 1,036,941. Aug. 27. R. Weiss. Apparatus for boiling and bleaching textil materials.

135. Bleaching Of Cotton Piece-Goods By Treatment In Roll Form In Flat Condition. Anon. *Textile Mercury*, Sept., 1912; through *Leipziger Farber-Ztg.*, 62, 69-71.—Details of bleaching in the 2 forms are given; also a comparison of the old method using a bleach soln. 0.2-0.4° Be'. with the new in which the bleach soln. has a strength of 1-2 Be'.

136. U. S., 1,026,583, May 14. E. Herzog. Bleaching apparatus.

137. U. S., 1,020,452, March 19. A. Schiffers. Apparatus for dyeing and bleaching.

138. Ger., 270,571. Oct. 16, 1912. Addition to 260,177 (*Chem. Abstracts* 7, 3236). Gebr. Heine and Färbereien v. J. Schetty Söhne. Centrifuge For Dyeing, Bleaching, Washing, Nitrating, etc., Especially Of Textile Material.

139. Ger. 255,481, Sept. 1, 1911. C. G. Hauboldt, Jr., Machine for dyeing, bleaching, washing, and otherwise handling textiles.

140. Ger., 262,278, Sept. 20, 1911. Gebr. Sulzer. Centrifugal machine with vertical centrifugal action, for the wet treatment especially for the dyeing and bleaching of textile material.

141. Ger., 256,117, Aug. 26, 1911. A. Pelzer. Treating textile materials with circulating vat liquor, with the employment of 1 or 2 containers.

142. Ger., 263,118, Dec. 10, 1911. F. Gebauer. App. for disposing fibrous material in vessels for bleaching and like purposes.

143. Ger., 254,790. Aug. 8, 1911. T. Frusher and T. Frusher, Jr., App. For Dyeing, Bleaching, And Other Wet Handling Of Textile Materials With Circulating Liquor. Cf. *Chem. Abstracts* 6, 1676.

144. Ger., 266,183, Dec. 28, 1911. Addition to 246,115 (*Chem. Abstracts* 6, 2540). Niederlahn - Steiner Maschinenfabrik. Construction and Operation of an App. for Dyeing, Washing, Bleaching, etc., Yarn in Skeins.

145. Brit., 26,097, Nov. 22, 1911. S. M. Krosnowski. Accumulation apparatus for drying, steaming, bucking, bleaching, and impregnating cotton fabrics in the web in a continuous operation, the goods being exposed in a spread out condition a long time to the action of steam, etc., comprises 3 chambers; a treating chamber always under pressure, a charging chamber at the inlet thereof, normally under atmospheric pressure, and a discharging chamber at the outlet thereof, normally under the same pressure as and open to the treating chamber.

146. Brit., 12,399, May 23, 1911. S. Mycock. Constructional details of bleaching kiers, etc.

147. Brit., 7,701, Mar. 28, 1911. G. S. Lord. In a machine for dyeing, sizing, bleaching, mordanting, scouring and similarly treating hanks of cotton.

148. Brit., 3,285, Feb. 9, 1911. C. Hall. Bleaching apparatus.

149. U. S., 1,008,413, Nov. 14. A. Huillard, Paris, France. Bleaching piece goods by stacking them flatwise in a vat, maintaining the stack against displacement and circulating bleaching liquor through the goods, transversely, first in one direction and then in the reverse direction.

150. U. S., 983,951, Feb. 14. Friedrich C. Theis, Höchst a/M, Germany. Assignor to Farb-

werke vorm. Meister Lucius & Brüning, same place. Bleaching Vegetable Fibers Or Fabrics Dyed With Vat Dyes so as to avoid bleeding of the dye into the undyed portion, by subjecting the material to the action of a boiling alkaline soln. containing alkali bromate.

151. U. S., 986,332, Mar. 7, Robert Weiss, Kingersheim, Germany. Boiling, Washing Or Bleaching Textile Fabric by subjecting by periodical successions a plurality of batches of the material to three different operations in the same treating liquid, first impregnating the material by forcing the liquid upwardly through it, then reversing the flow and draining off the liquid almost completely by aspiration from below and then moistening from above by a percolating or filtering action only, the immersion of one batch occurring while draining and moistening another batch.

152. Apparatus For Bleaching And Dyeing. T. and M. Shimizu. Jap., 31,282, July 7, 1917.

153. Ger. 269,992, Oct. 4, 1910. Addition to 202,629. E. Ringenbach. App. For Boiling And Steaming, In Connection With a Continuous Process of Bleaching Textile Material.

154. Ger. 249,220, Feb. 2, 1910. F. Jaumandreu. An App. For Dyeing, Bleaching, And Similarly Treating, Yarn.

155. Ger., 238,993, July 10, 1910. Fr. Gebauer. Bleaching Process For Vegetable Fabrics, Yarns, Fibers, And The Like. In order to attack the particles of wood, seed shells, or vegetable impurities independently of the cotton fiber, the carbonization process is employed before or after the bucking and cooking processes, and, according to the strength of the shells or impurities, coloring and continuing only so far that the cotton fiber is not attacked by reason of the incrustation which still protects the fiber.

156. Brit., 27,570, Nov. 26, 1010. V. Del Prato (née Viscardi), et al. Degumming And Bleaching Vegetable Fibers.

157. Report Of Committee On Standard Specifications. H. J. Skinner. *J. Ind. Eng. Chem.*, 3, 860-3.—Report of the subcommittee on bleach and solder specifications.

158. Improvements In Cotton Bleaching. W. S. Williams. *Met. Chem. Eng.*, 9, 247-50.—W. Takes up the comp. of cotton, and the various steps as practised in bleaching cotton, going into considerable detail as to the theory and practical working of each step. Cooperation between the heads of the industry in this country would do much to put the bleaching of cotton upon a scientific basis.

159. Bureau, R.: La Technique Du Blanchiment Moderne. Paris: D. Desforges. 2 Fr.

160. Walland, H.: Kenntnis Der Wasch-, Bleich-, u. Appreturmittel. Berlin: J. Springer. 326 ss. 10 M.

161. Chaplet, A., and Roussel, H.: Le Blanchiment. Chimie Et Technologie Des Procedes Industriels De Blanchiment. Paris: 8°, 171 pp., 2 M.

162. Herzfeld, J.: Das Farben Und Bleichen Von Wolle, Baumwolle, Seide, Jute, Leinen Usw. 3 Teil, 3 Lfg., 3 Aufl. Berlin: M. Krayn. 1 M.

163. Trotman, S. R.: The Principles Of Bleaching And Finishing Cotton. London: Chas. Griffin & Co. 8°, 341 pp., $4.00.

HOW MATERIAL IS AFFECTED

1. Chemical Processing Of Indian Cotton Materials. Influence Of Different Concentrations Of Caustic Soda On The Quality Of Kier-Boiled And Bleached Yarns Spun From Indian Cottons. Nazir Ahmad, M. U. Parmar, and K. Venkataraman (Univ. of Bombay). *J. Indian Chem. Soc. Ind. & News Ed.* 9, 1-21 (1946); cf. *Chem. Abstracts* 36, 661.[5]; 37, 777.[4] Tests were performed on yarns spun from 4 Indian cottons, Jayawant, Cambodia Co. 2, Surat 1027 A. L. F., and P. A. 289F. Samples of yarns were kier-boiled with concns. of NaOH from 1 to 10%, with and without wetting agents and other assistants. These yarns were then after-treated by each of 3 methods including sours and bleaches. The samples were then compared on the following bases; Concns. of NaOH above 4-5% in the kier gave yarns of increased cuprammonium fluidity after bleaching, showing adverse effect. Complete removal of wax in kier-boiling isessential to producing a yarn of max. strength. Luster, whiteness, and wettability show no consistant or significant trends for any one cotton. Presence of kier assistants had no marked effect on cuprammonium fluidities, except for special cases. The same is noted for strength, luster, and whiteness. Wettability is improved for samples processed with wetting agents. Open kier-boiling with soda ash caused slightly greater degradation than pressure-kier-boiling with NaOH, but the difference was greatly increased by subsequent bleaching. The open-boiled yarns also possessed poorer wettability. Cotton variety bore definite relationship to chem. damage in kier-boiling and bleaching; in work of increasing susceptibility to damage the tested varieties were Jayawant, P. A. 289F, Cambodia Co. 2, and Surat 1027 A. L. F. Fluidity values and count-strength products showed good correlation throughout the tests. On the basis of whiteness and luster combined, Surat 1027 A. L. F. proved best. Bleached samples showed higher wettability than unbleached, kier-boiled cottons, and varieties were significantly different from each other in this respect. They worked as follows in this respect; P. A. 289F, Surat 1027 A. L. F., Combodia and Jayawant. No significant difference in percentage weight loss by various kier-boil treatments was noted for each cotton. No significant differences in Cl consumption during bleaching was noted, either in regard to cotton varieties or to kier treatments.

2. The Finishing Of Fabrics. Emil Rochstatter. *Melliand Textilber*, 23, 503 (1942). Tests on the bleaching of cotton goods are described.

3. The Prevention Of Damage To Cellulose Fibers In Bleaching Operations. Hans-Joachim Henk. *Deut. Wollen-Gewerbe* 74, 249-52 (1942); *Chem. Zentr.* 1942, II, 479. The most important causes of damage (which are neglected most frequently) are the excessive oxidation of cellulose as a result of the presence of catalysts, hydrolytic degradation of cellulose through decompn. of chloroamines, deterioration of the feel, and yellowing of the bleached goods. These defects are eliminated by the addn. of retardants and catalytic poisons as well as the lowering of temp. The chloroamines formed from the proteins can be removed completely by aftertreatment with $NaHSO_3$ of $Na_2S_2O_5$. The deterioration of the feel can be prevented by proper soaping and later addn. of fatty or hygroscopic substances. The yellowing of bleached goods is due either to the decompn. of residual chlorohydrins, which can be removed by oxidative aftertreatments, or to soap residues, which had become rancid; the latter defect can hardly occur with proper soaping.

4. The Effect Of Bleaching Defects On The Strength And Tension Of Rayon. Horst Bach. *Kunstseide u Zellwolle* 21, 109-112 (1939); cf. *Chem. Abstracts* 33, 1149.[4] Treatment with soda soln., such as during laundering, has no effect on bleached rayon, but quite a marked degrading effect on bleached rayon or rayon damaged by acid treatment. (*Chem. Abstracts* 1939).

5. Bleaching Bast Fibers. E. Kayser. Melliand-Textilber 19, 725-7 (1938). Nodder's soly. no. (cf. *Chem. Abstracts* 26, 1436) is of value for estg. the degree of degradation of cellulosic fibers during various textile processes, e.g., bleaching. Although no conclusions could be drawn as to the soly. no. of native, undegraded bast fibers, the conventional alk. bleaching process caused more degradation of tow and flax yarns than the I. G. "Korte" bleaching process. (*Chem. Abstracts* 1939).

6. The Effect Of Bleaching Defects On The Strength And Tension Of Rayon. Horst Bach. *Kunstseide u. Zellwolle* 20, 433-7 (1938). Viscose rayon was soaked for 30 min. in 0.25 cc. concd. H_2SO_4 per l. at 20°, pressed to 150% moisture content and dried for 1 hr. at 100°. The dry strength of the treated rayon was thus reduced to about 45% of the untreated. In another test, rayon was soaked for 30 min. in 20 cc. concd. HCl per l. at 20°, pressed to 150% moisture and dried in the air without further washing. In 3 days the dry strength dropped to 75% of the original and in 31 days to 55% of the original. This damage occurred during air-drying since no drop in strength was found when the acid was washed out after the 30 min. treatment. To det. the effect of lower concns. of acid at elevated temp. rayon was treated for 30 min. with increasing amts of 0.5, 1, 2, 4 and 8 cc. concd. HCl per l., pressed to 150% moisture and dried for 90 min. at 60°. The dry strength decreased to about 70% of the original after treatment with the 0.5 cc. HCl and to 30% with the 8 cc. HCl/l. while the wet strength decreased to 43

and 25% of the original, resp. The complete exptl. results are given in detailed graphs. (*Chem. Abstracts* 1939).

7. Chemical And Physical Properties Of Cotton. Albert Richter. *Deut. Wollen-Gewerbe* 70, 560-2 (1938). A review dealing with compn., structure of native cellulose and the effect on cotton of water, NaOH, acids, oxidizing and reducing agents, salts and textile assistants. Photo-micrographs are shown of undamaged cotton and oxycellulose aftertreatment with Na zincate and of unmercerized and well-mercerized cotton. (*Chem. Abstracts* 1938).

8. The Bleaching Of Cottons And Comparative Studies Of The Properties Of The Unbleached and Bleached Cottons. D. I. Rudakov and A. A. Rogovina. *Za Rekonstruktsiyu Tekstil. Prom.* 14, No. 7, 21-32; *Chem. Zentr.* 1938, I, 775. (*Chem. Abstracts* 1939).

9. Bleaching Damage To Rayon. Hans-Joachim Henk. *Kunstseide N. Zellwolle* 20, 244-5 (1938). A general discussion of the precautions to be followed and the type of damage caused by the bleaching operation. (*Chem. Abstracts* 1938).

10. The Action Of Steam at Different Pressures Upon the Behavior of Cotton Toward Reagents and Dyes. Haller. *Klepzig's Textil Z.* 40, 273-5 (1937). Raw and bleached fibers treated with a rapid steamer for 5 min. showed under the microscope no structural changes. In the raw fiber steaming increased the wetting power and increased the adsorptive power for I. In both raw and bleached fiber dyeing with indigo was greatly decreased. Treatment with mercerizing liquor of 25° Bé. did not change the structure of the raw or bleached cotton, but the intensity of Congo red dyeing of the steamed fiber was greater than that of unsteamed mercerized fiber. Steaming both fibers for 1 hr. at ½ and 1 atm. gave results duplicating those obtained with flowing steam on short exposure. Exposure of raw and bleached cotton to steam at 5 atm. for 1 hr. produced definite structural changes. Fibers treated with low-pressure steam become pale green upon treatment with Fehling soln.; when high-pressure steam has been used the same reagent will produce a bluish green or even an indigo-blue color. Under the microscope the raw fiber turned pale brown. In practical tests steamed cotton gave lighter vat dyeings than unsteamed cotton. Brief exposure to steam causes a definite state of permanent swelling which exerts a definite influence upon the colloidal leuco dyes in the vat. (*Chem. Abstracts* 1937).

11. Bleaching, of Cotton Fabric, Removal of Non-cellulose Constituents In, *Chem. Abstracts* 1928, p. 3302.[8] Removal of Non-cellulose Constituents of Cotton in Scouring and Bleaching of Fabric. M. Freiberger. *Textile World* 73, 3971-3 (1928); *J. Textile Inst.* 19, 134-7P (1928).—A review of recent discoveries in the chemistry involved and a discussion of related technical questions. The most important substances to be removed from cotton cellulose are starches, fats, pectins, proteins, pigments and mineral matters, each of which is discussed individually.

12. Bleaching, Book Of Textile Fabrics. *Chem. Abstracts* 1928, p. 1858.[7] Matthews, J. Merritt: Bleaching of Textile Fabrics. New York: The Chemical Catalog Co., Inc. 676 pp. $10.00.

13. Bleaching Of Knit Goods. *Chem. Abstracts* 1927, p. 3748.[5] Bleaching and Dyeing Knit Goods without Detriment to their Structure. George Rice. *Am. Dyestuff Reptr.* 16, 578-9 (1927).

14. Bleaching, Of Cotton. *Chem. Abstracts* 1928, p. 321.[6] Bleaching, Singeing and Finishing of Cotton Cloth. D. B. Alexander. *Am. Dyestuff Reptr.* 16, 701-5 (1927).—The objects and reasons of the various operations on cotton cloth are stated, and modern machinery and procedures are described.

15. Defects In Finished Cotton Goods. Sources of imperfections that show in later processes. Louis J. Matos. *Text. World J.* 55, 39-41 (1919).

16. Oxygen Corrosion In Wash Goods. II. Replies And Supplementary Remarks. P. Heermann. *Seifenfabr.* 38, 498-501, 521-3 (1918); cf. *Chem. Abstracts* 13, 1020.—H. Answers his critics (cf. *Chem. Abstracts* 13, 1404) by reaffirming that his observations on the destructive action of Cu salts in wash goods are original by bringing exptl, proof of the damage; that the oxygen corrosion is not restricted to isolated cases; that his concn. of 0.01% active O coincides with practical usage, —In his final summary H. rejects all O bleaching agents as absolutely and relatively injurious.

17. Testing Quality Of Bleached Goods. J. Merritt Matthews. *Color Tex.* 11-13 (1918). —The amt. of ash obtained from ignition of bleached cloth is an indication of the quality of the bleach. If the ash is high (over 0.20°) cellulose may be detd. by the use of methylene blue for which it has a greater aff. for unaltered cotton, also through the use of Fehling soln. Bleached cotton should be tested for acidity, free fat, and lime soap.

18. The Results Of Various Chemicking Treatments With Thick, Fully-Bleached Goods. M. Freiberger. *Z angew Chem.* 29, I, 397-400 (1916).—A thick drill goods, made of thickly woven Indian and American cotton yarn was subjected to various chemicking processes, and the results obtained compared.

19. Causes Of Damage In Bleaching Of Linen And Cotton Textiles. *Soc. Chem. Ind.* 35, 78-80 (1916).

20. Losses In Bleaching Union And Linen Towels. Harper. *Textile World* 48, 25 (1916). —Union huck towels are almost invariably made from cotton, either single or two-ply, and linen filling. For special purposes, the construction is reverse.

21. Stains In Cotton Goods Bleaching And Finishing. Louis J. Matos. *Textile Research J.* 51, No. 44, 23 (1916).

22. Failures In Bleaching. A. Kramer. *Seifensieder-Ztg.* 42, 308 (1915).—Spots which are often found on fibers after bleaching are due to oxycellulose which absorbs bleaching chemicals in different proportions from regular fiber.

23. Importance of a Consideration of The Fiber Proteins in the Process of Bleaching Cotton. B. S. Levine. Providence. Brown Univ. *Science* 41, 543-5 (1915).

CHLORINE

1. Installation for Direct Treatment of Plant Fibers with Gaseous or Liquid Chlorine. E. Opfermann and F. Opderbeck (to Schlesische Zellwolle A. G.). Ger. 725,722, Aug. 13, 1942 (Cl. 55c. 1).

2. Installation for Direct Treatment of Plant Fibers with Gaseous or Liquid Chlorine. E. Opfermann and F. Opderbeck (to Schlesische Zellwolle A.-G.). German Patent 725,722, August 13, 1942.

3. A New Method Of Bleaching Cotton Fabrics With Chlorine Gas. N. A. Milinskii, A. P. Zakoshchikov, N. A. Boris and N. I. Stepanova. Novye Metody Beleniya Krasheniya i-Otdelki Khlopchatobumazh. Tkanei, Sbornik Rabot Khim.-Kolorist Otdel, Nausch.-Issledovatel. Inst. *Khlopchato-bumazhnoi Prom.* 1939, 7-41; Khim, *Referat. Zhur.* 1940, No. 8, 108-9; c. f. *Chem. Abstracts* 36, 1186. The fabric is wet with water (not in NaOH soln.), treated with Cl, washed with water and alkali, boiled in NaOH soln. with rosin soap, washed, treated with NaCl soln., washed, acidified, washed and dried. Cl transforms the noncellulose substances partly into polymeric derivs. of sugars and starch, which during the subsequent treatment with alkali are easily sepd. from the fabric. Wetting in water produces a strong fabric with a high capillarity, whiteness and viscosity and permits a longer treatment with Cl_2 than is possible on wetting the fabric in alkali. The method was verified in the lab. and under semi-production and prodn. conditions. Good results obtd. *Chem. Abstracts* 36, 7326.

4. Chlorine Bleaching of Textiles. N. A. Milinskii, N. A. Boris and N. I. Stepanova. Novye Metody Beleniya Krasheniya i Otdelki Khlopchatobumazh. Tkanei, Sbornik Rabot Khim.-Kolorist. Otdel. Nauch.-Issledovatel. *Inst. Khlopchatobremanzhnoi Prom.* 1939, 42-6: *Khim. Referat Zhur.* 1940, No. 8, 109. Bleaching with Cl gas decreases considerably the time required for bleaching and the no. of operations, and improves the quality of bleaching, preserves the strength of the fibers and permits continuous operation. *Chem. Abstracts* 36, 7326.

5. The Use of Liquid Chlorine in the Bleaching of Cotton and Linen. Louis Bonnet. *Teintex* 3, 608-11 (1938). (*Chem. Abstracts* 1939). A. review. Twenty-nine references.

6. New Method Of Bleaching Cotton Goods By Means Of Chlorine Gas. N. A. Milinskii. *Chimie & Industrie* 39, 748. In the chlorination of fabrics substitution reactions predominate, and oxidation reactions play a less important part. The acid medium which is

formed by chlorination protects the cellulose against oxidation, and at the same time is insufficient to produce hydrolysis. Cl bleaching comprises the following steps: (1) Chlorination for 15 min. of the moistened raw fabric with Cl gas. (2) Washing in H_2O and then in an alk. sulfite soln. (5% NaOH and 10% $NaSO_3$) at 60-70°. (3) Boiling for 30 min. in a 2% NaOH soln. in presence of 0.5% Na ricinoleate (or other wetting agent). (4) Washing in hot, and then in cold water. (5) Treatment with NaOCl (1% available Cl) for 30 min. (6) Washing with cold water. (7) Acidification with H_2SO_4 and final washing with cold water. (*Chem. Abstracts* 1938).

7. Bleaching Fabrics. Bohme Fettchemic-G. m. b. H. (Karl Butz, Gustav Deuschle and Gunther Simon, inventors). Ger. 653,989. Dec. 8, 1937. (Cl. 8*i* 1). Fabrics made from vegetable fibers are bleached by treatment with an alk. Cl bleaching liquor and then with an alk. liquor contg. active 0. The fabric may be first treated with a wetting agent. A stabilizing agent may be added. In an example, knit lace of vegetable fiber is immersed in an aq. bath of highly sulfonated castor oil and then treated with a Na-Cl bleaching liquor contg. 4 g. active Cl per l. The material is then squeezed and treated with a bath contg. water, water glass, NaOH and H_2O_2. The bleached material is then rinsed and dried. (*Chem. Abstracts* 1938).

8. Bleaching Agents. Jacob Rosin. Fr. 824,-675, Feb.. 14, 1938. An aq. soln. having the properties of Javel Water is made by accelerating the dissolving in water of Cl compds., e. g., NaOCl, $CaOCl_2$, "Perchloron," "Caporit" and "H.T.H.," by means of $CH_2ClCOOH$ (I) The Cl compd. and I may be made up into the same or different tablets with starch or other binder. (*Chem. Abstracts* 1938).

9. Bleaching Plant Fibers. N. A. Milinskii. *Russ.* 51, 781. September 30, 1937. The wet raw material is treated with gaseous Cl sufficiently long for the chlorination of the incrustants, then washed consecutively with water, alk. soln. of sulfite, and H_2O_2, and boiled with alkali in the presence of emulsifiers. *Chem. Abstracts* 36, 2483 (1942).

10. Bleaching Viscose Yarn With Chlorine. John S. Fonda and Geo. W. Filson (to du Pont & Co.) U. S. 2,064,300, Dec. 15. A compact package of yarn produced from viscose is treated with Cl water contg. 0.003-0.01% of Cl and having a pH of about 6.0-8.0, without appreciable swelling of the yarn. (*Chem. Abstracts* 1937).

11. Stability Of Chlorine Water. E. A. Shilov and G. V. Kupinskaya. *Byull. IvNITI* 12, No. 6, 39-45 (1936). The decompn. of Cl_2 in H_2O proceeds very slowly in the dark at 25°, and somewhat more rapidly in diffused light. The decompn. is accelerated by the presence of $CaCl_2$, $FeCl_3$, $MgSO_4$ and MnO_2. The chief loss of Cl_2 is caused by volatilization. In practical bleaching the hydrolysis and decompn. of Cl_2 water can be disregarded. Ten references. (*Chem. Abstracts* 1937).

12. Bleaching Bast Fibers. I. G. Farbenindustrie A.-G. Brit. 450-253, July 13, 1936. Bast fibers, particularly on crosswound bobbins, are bleached by chlorinating the impurities with Cl water in a satd. or supersatd. form but not contg. undissolved Cl, the Cl water acting directly after it has been made upon the fibers. App. is described (*Chem. Abstracts* 1936).

13. Bleaching Textile Fibers. I. G. Farbenind. A.-G. Fr. 784,524, July 22, 1935. The chlorinated water, preferably satd. or supersatd., is caused to act on the material to be bleached directly after its prepn. App. is described in which the bleaching and chlorination of the water form a closed system. (*Chem. Abstracts* 1936).

14. Bleaching Of Textiles, In Thick Rolls. *Chem. Abstracts* 1935, p. 1663.[4] *Bleaching Textiles.* Comptoir des textiles artificiels (Soc. anon.). Fr. 773,690, Nov. 23, 1934. Artificial textiles of a cellulosic nature, in thick rolls, are treated at ordinary temp. with water contg. 20-50 parts of active Cl dissolved in 1 million parts of water and the pH of which is 6-8.

15. Bleaching Of Cotton Cloth With Liquid Cl., *Chem. Abstracts* 1931, p. 2570.[9] The Use of Liquid Chlorine in the Industry of Bleaching Cotton Cloth. LaBlanchisserie Et Teinturerie De Thaon - Les - Vosges. (sealed communication of 1914.) *Bull Soc. Ind. Mulhouse* 97, 60-2 (1931).—A process for the prepn. of hypochlorite liquors and their use in bleaching cotton are described. The app. consists of a column in which an ascending stream of Cl gas meets a spray of NaOH soln. or milk of lime.

16. Bleaching, Liquid Cl In. *Chem. Abstracts* 1928, p. 168.[6] Liquid Chlorine in Textile Bleaching. W. E. Phillips. *Am. Dyestuff Reptr.* 16, 648-50.—The advantages of liquid Cl over bleaching powder are stated and a method of using liquid Cl is described.

17. Bleaching, Of Washed Goods. *Chem. Abstracts* 1926, p. 116.[2] M. G. Donk and W. D. Marshall. U. S. 1, 550,518, Aug. 18. The goods are agitated in a soln. of Na_2CO_3 or other alk. soln. and Cl is introduced. The alkalinity of the soln. is maintained at such a point that no substantial amt. of HOCl will be formed.

18. Bleaching. G. Ornstein. U. S. 1,298,552. Mar. 25, 1919. Cl is hydrolyzed in H_2O under such conditions as to produce HOCl in free state in a dil. soln. containing only about 0.10% Cl and this soln. is used for bleaching paper, cloth or other materials, U. S. 1,298,553 relates to the production of a bleaching liquor by introducing Cl into H_2O and employing sufficient H_2O and basic material such as ZnO or borax or $NaHCO_3$ to give a very dil. soln. and to combine with all the HCl produced by the conversion of the Cl into HOCl and in the bleaching operation in which the soln. is used. The material to be bleached, e. g., cloth or paper pulp, is acted on by the soln. simultaneously with the production of the HOCl in it by hydrolysis of the Cl. U. S. 1,298,554 relates to a similar process in which Na_2CO_3 is used as the agent for neutralizing the HCl formed.

19. U. S. 1,146,461, July 13. C. Taylor. Bleaching textile fabrics by satg. with a soln. of Cl and H_2O pressing the soln. into the pores of the material, treating with NaOH soln. to remove fatty and resinous compds., pressing and steaming under low pressure for 3-4 hrs. while acted on with NaOH soln., again pressing and treating with Cl and H_2O, first with a weak and then with a stronger soln.

20. Ger. 258,696, Feb. 13, 1912. V. Jaeggle. App. for bleaching textils with circulating bleaching fluid, especially Cl-soln., in an open vat.

21. Ger., 281,581, Dec. 23, 1910. W. Mathesius and Mr. Freiberger. In bleaching cotton goods, the material, bucked in the usual manner, is immersed in a heated alk. ice bath, preferably in a continuous operation. The Cl-content of the material after treatment is reduced to 1/15 by rinsing with a more dil. Cl liquor. The material is then passed through a similar app. in which an acid Cl soln. is allowed to act. The material is then washed in the usual manner. The baths are heated to facilitate the bleaching action. In order that the Cl baths shall not be heated too strongly, a heating agent is employed whose temp. is but slightly above that of the desired temp. of the Cl baths (e. g., warm H_2O). In this process the alk. Cl bleaching process need not be carried to the formation of oxycellulose.

22. Pat. 364,797. Mar. 31, 1906. Leitschmer, Germany, Process of bleaching textile fibers, threads and tissues, consisting in subjecting the fibers to the action of steam, then of gaseous chlorine or other gaseous bleaching agents, then absorbing the chlorine by a gas such a hydrogen or a salt such as sodium or other hyposulfite.

SODIUM CHLORITE

1. Cellulose. Bleaching With Sodium Chlorite. A. Klein. *Teintex* II, 285, 287, 289-91, 293, 321-5, 327, 349-51, 353-4 (1946). *J. Textile Inst.* 38, A163 (1947). A systematic study has been carried out of the bleaching action of $NaClO_2$ and of its behavior towards cellulose. The results obtained are compared with those resulting from the use of other bleaching agents such as H_2O_2 and NaClO. The problem of the effect of the presence of metals on the stability of the bleach has also been studied. The "length" stability of the bath was 1:10 in the case of staple fiber and 1:6 for cotton. Whiteness degrees were detd. before and after aging, and break resistance, degree of polymerization, and degradation corff. were also detd. The pH was ascertained throughout the operation. Expts. with staple fiber and with cotton are fully described and all results are presented in graphs and tables. It is shown that $NaClO_2$ bleaching can lead to a higher degree of whiteness than the H_2O_2 treatment if the operation is carried out at a pH below 4. In practice this will necessitate a modification of

existing equipment in order to prevent corrosion and spontaneous decompn. of the chlorite by catalysis. For continuous chlorite bleaching, provision must be made for the continuous addn. of a more concd. soln. to compensate for losses due to decompn. and a permanent pH control is necessary as the chlorite solns. have the tendency to reach a pH between 5 and 6.

2. Characteristics Of Chlorite Chemistry With Special Consideration Of Its Use For Bleaching. L. T. Muus and I. Refn. *Tids. Textiltek* 4, 173-80 (1946). A very complete review of the manuf. of ClO_2 and ClO + and their use in the bleaching of textiles. Other uses of ClO_2 — as finishing agent, for bleaching of paper, and as oxidant for vat and S dyes are described. 58 references.

3. Bleaching Cellulosic Materials. Clifford A. Hempel (to the Mathieson Alkali Works, Inc.) U. S. 2,367,771, Jan. 23, 1945. Wood pulp produced by the kraft sulfite or soda process, cotton linters, hemp, and derivs. of cellulose such as rayon or woven fabrics produced from cellulose fibers are bleached to a high degree of whiteness without substantial degradation with an aq. soln. of a chlorite of an alkali or alk. earth metal, such as $NaClO_2$ or $Ca(ClO_2)_2$ and an aldehyde, such as CH_2O, AcH, paraformaldehyde or BzH, the 5 and 6-C atom aldose sugars and inverted sucrose. Their resp. mol. ratios may vary from 1:1 to an excess of aldehyde. The pH of the soln. is preferably 6-8 and may be adjusted by addn. of NaH_2PO_4 or Na_2HPO_4. The bleaching is carried out at consistencies of about 5% and up to 15%.

4. Bleaching And Scouring Of Cellulosic Textile Materials. Geo. P. Vincent, Archie L. Dubeau, and John F. Synan (to Mathieson Alkali Works, Inc.). U. S. 2,383,900, Aug. 28, 1945. Good color and mote removal, and excellent strength and dyeing quality are obtained, with little oxycellulose formation. The yarn is bleached, in a package machine, 5 min. with a soln. of $NaClO_2$ 4-6, $Na_4P_2O_7$ 19-24, and Igepon T (or Mapromine, Gardinol, Modinol, Nacconal, Aerosol or Santomerse) 1-2 parts, at 30-35°; 10% NaOCl 90-125 parts is added and the yarn scoured 45-90 min. (the temp. is increased to 78-93° after 15-45 min.). This soln. is at pH 8-11, and has available Cl 1-10 g. per l. from $NaClO_2$ and NaOCl in the ratio 1:1.5.

5. Bleaching Cellulosic Materials. C. A. Hampel (to The Mathieson Alkali Works, Inc.). U. S. 2,367,771, January 23, 1945. Wood pulp . . . cotton linters, etc. are bleached to a high degree of whiteness without substantial degradation with an aq. soln. of a chlorite of an alkali or alk. earth metal, such as $NaClO_2$ of $Ca(ClO_2)_2$ and an aldehyde, such as CH_2O, AcH, para-formaldehyde or BzH, the 5- and 6-C atom aldose sugars and inverted sucrose. The pH of the soln. is preferably 6-8 and may be adjusted by addn. of Na_2HPO_4. Same as Brit. Pat. 561,022, May 2, 1944 and Canada Pat. 418,431, February 15, 1944.

6. Bleaching And Scouring Of Cellulosic Textile Materials. J. P. Vincent, A. L. Dubeau and J. F. Synan (to Mathieson Alkali Works) U. S. 2,383,900, August 28, 1945. Good color and mote removal, and excellent strength and dyeing quality are obtained, with little oxycellulose formation. The yarn is bleached, in a package machine, 5 min. with a soln. of $NaClO_2$ 4-6, $Na_4P_2O_7$ 19-24, and Igepon T (or Mapromine, Gardinol, Modinal, Nacconal, Aerosol or Santomerse) 1-2 parts, at 30-35°; 10% NaOCl 90-125 parts is added and the yarn scoured 45-90 min. (the temp. is increased to 78-93° after 15-45 min.). This soln, is at pH 8-11, and has available Cl 1-10 g. per l. for $NaClO_2$ and NaOCl in the ratio 1:1.5.

7. Bleaching Cellulosic Materials Such As Kraft Pulp Or Muslin. C. A. Hampel (to The Mathieson Alkali Works, Inc). U. S. 2,383,823, July 18, 1944. Cellulosic matl. is treated with an aq. soln. contg. an alkali metal or an alk. earth metal chlorite and an alkali metal or an alk. earth metal persulfate at pH about 3-11. (same as Can. 418,430, February 15, 1944).

8. Bleaching Cellulose Materials. Clifford A. Hampel (to Mathieson Alkali Works). Brit. 561,022, May 2, 1944. Cellulose materials can be bleached to a high degree and without substantial degradation by the combined action of chlorites and aldehydes in an aq. soln. at a pH of about 3.0-9.0. Suitable chlorites are those of the alkali metals and the alk. earth metals, such as $NaClO_2$ and $Ca(ClO_2)_2$. Suitable aldehydes are CH_2O, AcH, paraformaldehyde, furfural. BzH, the 5 and 6 carbonaldose sugars, and inverted sucrose. A suitable mol. ratio of chlorite to aldehyde is 1:1. The ratio of the wt. of the cellulose material to the wt. of the soln. may vary from 5% to 25%; in the examples cited the ratio was about 5%. A typical concn. used in the examples is 0.177 g. of $NaClO_2$ and 2 g. of CH_2O per 2000 cc. of water. The treatment is continued 1-2 hrs. at 500-560°. The pH in the examples given varied from 6.9 to 9.0. The presence of phosphates reduces the consumption of chlorite otherwise required. Cf. C. A. 39,3669.†

9. Bleaching Cellulosic Materials. Clifford A. Hampel (to Mathieson Alkali Works) Brit. 560,995, May 1, 1944. Cellulosic materials can be bleached to a high degree without substantial degradation by subjecting the cellulosic material to the joint action of chlorites and persulfates in aq. soln. at a pH about 3-11 and a temp. of about 60-80°. The useful chlorites are $NaClO_2$ and $Ca(ClO_2)_2$ and the useful persulfates are $Na_2S_2O_8$, $K_2S_2O_8$, and the persulfates of the alk. earth metals, Cf. C. A. 39, 3669.†

10. Bleaching And Finishing Textiles. Geo. P. Vincent and Archie L. Dubeau (to The Mathieson Alkali Works). Brit. 552,711, April 21, 1943. Unfinished cotton textiles, etc., are treated so that the cloth is bleached and acquires improved absorbency for dyes. The textile is impregnated with an aq. soln. of Na chlorite and the resultant wet mass is exposed in the presence of as much of the soln. as is entrained by the textile to contact with steam. When this textile is later dyed, deeper shades are obtained with less dye.

11. Disintegration Of Tow With $NaClO_2$. K.-Chr. Menzel *Allgem, Textil*-Z. I, 201-4 (1943); *Chem. Zentr.* 1943, II, 2274.—The best temperature is 65°. The initial pH should be adjusted with AcOH + HCl to about 3.5. $NaClO_2$ in combination with NaOH does not exert any specific disintegrating action, but has an appreciable bleaching action without any deleterious influence on the feel or the strength of the fiber. The addn. of wetting agents improves the whiteness. In comparison with acid and alk. hypochlorite and H_2O_2, $NaClO_2$ exhibits a good whitening effect with an av. loss in weight. H_2O_2 bleaching produces a good whitening and low wt. losses.

12. Bleaching And Finishing Textiles. G. P. Vincent and A. L. Dubeau. (to Mathieson Alkali Works) British 552,711, April 21, 1943. Unfinished cotton textiles, etc., are treated so that the cloth is bleached and acquires improved absorbency for dyes. The textile is impregnated with an aq. soln. of Na chlorite and the resultant wet mass is exposed in the pres. of as much of the soln. as is entrained by the textile to contact with steam. *Chem. Abstracts* 38, 4454 (1944).

13. Bleaching Cellulosic Material. Deutsche Gold-und Silber-Scheideanstalt vorm. Roessler. Belg. 446,444, August 31, 1942. The material is first treated in acid medium, at atm. or slightly higher temp., with limited quantities of chlorite so that nearly all the ClO_2 formed is absorbed in 1-2 hours. by the impurities of the raw materials. After washing the material is bleached with hypochlorite. It is advantageous to subject the material to chlorination by liberation of Cl in the bath before treating it with chlorite. *Chem. Abstracts* 39, 820.

14. Some Applications Of Textone In The Textile Industry. E. G. Fenrish and G. P. Vincent. *Am. Dyestuff Reptr.* 31, No. 11.—Textone (sodium chlorite, $NaClO_2$) may be used to advantage in kier boiling acid-bleaching processes and in conjunction with hypochlorite both for bleaching yard goods and for yarns in package machines. The main value of $NaClO_2$ in bleaching lies in the fact that its oxidation potentials even in the acid pH range never reach a magnitude sufficiently high to oxidize the cellulose whereas hypochlorite very definitely does. B. A. Ryberg.

15. $NaClO_2$, A New High-Strength Oxidizing And Bleaching Agent. F. Delaroziere. *Rev. Prod. Chim.* 45, 73-6 (1942); *Chem. Zentr.* 1942, II, 1833. The prepn., properties and possibilities for using $NaClO_2$ are described. *Chem. Abstracts* 38, 2795.

16. $NaClO_2$, A New High-Strength Oxidizing And Bleaching Agent. F. Delaroziere. *Rev. Prod. Chim.* 45, 73-6 (1942); *Chem. Zentr.* 1942, II, 1833.—The prepn., properties and possibilities for using $NaClO_2$ are described. W.A.M. substances and lipoid sol. harmones that do not mix with H_2O_2. To inhibit the soly, of the harmones in the aq. phase inorg. salts in-

sol. in the extg. liquid are added to the mixt. For this purpose $(NH_4)_2SO_4$ is used advantageously. In the ext. the gonadotropic harmones are pptd. with ether. The lipoid-sol. substances are sepd. from the soln. by known means.

17. Bleaching (Of Cellulosic Materials) With $NaClO_2$. H. Korte and W. Kaufmann. *Melliand Textilber*, 23, 234-9. (1942).—Aq. $NaClO_2$, especially at pH about 3 (produced by AcOH (*I*) and 60° is preferable to aq. OCl — (*II*) or Na_2O_2 (*III*) for bleaching difficultly bleachable and readily degraded staple rayon and rayons, and produces a bright white color with min. reduction in strength and no change in a-cellulose content and degree of polymerization. It is more rapid than *III*, and can be used in a two-stage bleaching process to follow *II* or *III*. It is more stable than aq. ClO_2 (20.8% of which disappeared from a 3.4% aq. soln. in 28 days in the dark), the (I.G.) com. grade (82% $NaClO_2$) being stable for about 23 months. Aq. 0.1% $NaClO_2$ at pH about 7 is stable at not more than 60° for 6 hours.; its stability at 20° is reduced, and to approx. equal extents by acidification with HCl or I, but at 60° the effect of *I* is much less than that of HCl at 60°, though much greater at 20°.

18. Simultaneous Scouring And Bleaching Materials Such as Unfinished Cellulosic Fabrics With Chlorite. A. L. Dubeau (to Mathieson Alkali Works). U. S. 2,253,368, August 19, 1941. A process is employed which involves simultaneously bleaching and scouring by subjecting the fabric to the action of an aq. soln. contg. $NaClO_2$ and a detergent which is active in the pres. of the acid and is substantially unoxidized by the $NaClO_2$, the detergent being from the group consisting of aliphatic alcohol sulfates, sulfonated fatty acid amides, sulfonated fatty acid esters, sulfonated succinic acid esters, alkylated aromatic sulfonates, or aliphatic sulfonates.

NASCENT HYDROGEN

1. Bleaching Cotton Textile Materials Such as Muslin. Rowland Magill (to M. Werk Co.). U. S. 2,063,176, Dec. 8. Nascent H is supplied to the material while boiling it in a closed chamber under pressure. (*Chem. Abstracts* 1937).

OZONIZED AIR

1. Bleaching Cellulose Fibers. Thomas C. Whitner (to Chemical Laboratories, Inc.). U. S. 2,438,100. March 16, 1948. Cellulosic fibers may be bleached by impregnating with 5-20% of an aq. soln. of an alkylolamine, such as monoethanolamine, triethanolamine, 2 amino-2 methyl-1 propanol and 2-amino-2-methyl-1,3-propanediol, and then treating with 1-1.5 mg/l. of O_3 for 30-60 mins. Improvements in bleaching, dye absorption, and dye fastness are affected by this process.

2. Ozone. Application In Bleaching. E. Howlett. *Textile Mfr.* 72, 412-14 (1946). *J. Textile Inst.* 38, No. 1-A14 (1947). Bleaching of yarns or fabrics in ozoneization chambers is considered. Details of plant requirements for the formation of ozone on a large scale are given. After kier boiling, the cloth passes a washing machine in the open width, then passes through a mangle, and finally is carried through the ozonizing chamber. The ozone-water method of bleaching, which consists of treating water with ozone and using it as a bleaching agent, is also discussed. Advantages of the ozone process are pointed out. Compared with the chlorination process there is a reduction in labor cost.

3. Bleaching Of Textiles, etc. *Chem. Abstracts* 1934, p. 3598.[9] Bleaching Textiles, etc. Felix Muller. Ger. 592,933, Feb. 17, 1934 (Cl. 8*i*. 1). Textiles and org. materials are bleached by a mixt. of NO_2 and O_3. The mixt. may be produced by subjecting a mixt. of NO_2 and air to a silent elec. discharge.

4. Bleaching Of Textiles *Chem. Abstracts* 1932, p. 5772[8] Bleaching Textiles. Hans W. Unger. Ger. 553,624, Aug. 3, 1930. Textiles, especially linens, are bleached by moistening with an electrolyte and using them as electrodes during treatment with ozonized O.

5. Bleaching Of Textile Fibers And Fabrics. *Chem. Abstracts* 1932, p. 1135[3]. Bleaching Textile Fibers and Fabrics, Oscar Hoffman, Ger. 536,067, Feb. 10, 1929. The moist materials are moved thru a chamber in which they are treated with ozonized air contg. at the most 2 g. per cm. of O_3, care being taken that the moisture content of these materials remains approx. constant during the treatment. This may be effected by careful addn. of steam to the ozonized air. The method is particularly applicable to the treatment of linen. App. is described.

6. Bleaching Of Textiles. *Chem. Abstracts* 1933, p. 1522.[7] Bleaching Textiles Bleaching Patent Processes, Ltd. Fr. 736, 761, May 6, 1932. Textiles are passed into and out of a bleaching liquid over which is an inclosed atm. contg. ozonized air.

7. Weighting, Fixing, Mordanting, Dyeing, And Bleaching Natural Silk, Artificial Silk, Cotton, Wool, And Other Textiles. Soc. De Teinture Et D'Appret Ci-Devant A. Clavel Et F. Lindenmeyer. Fr., 480,764, Sept. 21, 1916. In the production of the lather by means of acid, neutral, and alk. liquids, at various temps., according to the processes of patents dated Dec. 6, 1915 (Nos. not noted), (1) for the production at any temp. of lather for the treatment of textiles and (2) for the treatment of textiles, at any temp., by means of oxidizing, reducing, or indifferent gas, applied in lather, or for the production of lather by means of acid liquids by boiling the latter; saponins, glues, tannins, resins, or other like substances are added to these liquids.

8. Action Of Ozone On Textil Fibers. Chas. Doree. *J. Soc. Dyers Colourists*, 29, 205-12 cf. *Chem. Abstracts* 6, 1949; 7, 2385.—Great advantages of O_3 as an oxidizing agent are absence of by-products and secondary reactions. It must not be forgotten that vegetable and animal fibers in addition to being chem. units of apparently definit comp. are also structures. The results obtained apply generally to cotton, mercerized cotton and lustracellulose and may be summarized briefly as follows: Cotton when exposed to O_3 for a few hrs. acquires a fatty odor, is strongly acid when pressed on to moist litmus paper, and is able to liberate I from KI soln. The later property is due to the formation of a cellulose peroxide. In the absence of water, the action of O_3 is limited to the formation of a cellulose peroxide by the addition of an O atom at some reactive grouping in the cellulose mol. A little CO_2 is also formed. In the presence of water (the hydroscopic moisture being sufficient) the action of the O_3 continues. The peroxide first formed decomposes, possibly acting as a catalyst, and the cellulose is converted into oxycellulose and a solid, insol. acid. CO_2 is produced throughout this stage. The peroxide is recognized by its power of liberating I from KI soln. In this way the amt. of active O fixed by the cellulose can be estd. The amt. of acid produced is very considerable, and the production of CO_2 is slightly greater than, but runs parallel to, the activity developed. A number of tables and curves are given to show the action of O_3 on the breaking strength and elongation of gray cotton, and mercerized cotton and viscose silk. In general there is not more than 5% less strength at the end of 1 hr., but only partial bleaching is produced. At least 3 hrs. is required to produce a bleaching, in every case 12 hrs. action of O_3 reduces strength at least ½.

9. Brit., 13,902, June 16, 1913. Luftbleiche Ges. In the process of bleaching fibrous materials, by treatment with an alk. liquor, which contains a metal compd. catalyst, and into which is pumped air or O_3 as described in 9,369, 1910, portions of alkali are added to the liquor continuously or in successive doses during the process, or the alkali hydroxide consumed is regenerated by introducing an oxide or a hydroxide of a suitable metal.

10. Ger. 272,525, Dec. 15, 1912. E. Gminder. In the treatment of fibrous material with ozone, for bleaching, ozonized H_2O spray is led into a centrifuge containing the material to be treated, while the machine is in operation. The spray is produced by atomizing H_2O with ozonized air.

11. Brit., 1,727, Jan. 23, 1911. R. Müller, Eilenburg, Leipzig, Ger. Modification of the bleaching process of 9,369, of 1910, wherein the current of air or O is led into the soln. in such a manner that direct contact of the gas with the material to be bleached is avoided as far as possible.

12. Can. 153,745, Feb. 17, 1914. A. Schaidhauf. Bleaching textile fibers by treating the fiber with an alk. soln. containing active O rendered stable by the addition of an anti-catalytic.

13. Ger., 228,985, Sept. 12, 1909. Felten & Guillcaume Lahmeyerwerke Akt. Ges., Frankfurt a/M. App. for bleaching textils, especially woven ware, by means of O_3, by passing the moistened cloth through an O_3 chamber.

14. Ger., 240,037, Mar. 12, 1910. R. Müller. Bleaching cotton or other fibrous material by means of atm. O, whereby the material is heated in a dil. aq. soln. of alk. hydroxide or of an alk. reacting alk. salt (carbonate, borate, silicate), and air or O is introduced above the liquid, but not in contact with the material to be bleached, under pressure.

CHLORAMINE

1. Bleaching Of Fibers Simultaneously With Boiling. *Chem. Abstracts* 1933, p. 3338.[7] Can Vegetable Fibers Be Simultaneously Boiled and Bleached? K. Viart. *Tiba* II, 267 1933.—Attention is drawn to the advantages of the use of chloramine (either as activin, $MeC_6H_4SO_2NNaCl.\ 3H_2$), or as peractivin, $MeC_6H_4SO_2NaCl_2$ in the boiling of cotton. About 2-3 Kg. is use dper 1000 kg. of goods.

2. Bleaching, With Chloramine G (Activin). *Chem. Abstracts* 1927, p. 2802.[5] Activin in Textile Printing. R. Wegener. *Melliand Textilber.* 7, 446- (1926).—The stability and mild oxidizing power of activin soln. makes it suitable for many mild bleaching actions. Thus, wool may be prepd. for printing by soaking in a 0.1% acidified soln. followed by antichloring, and whites on cotton cleared with a 0.2% soln. acidified with HCOOH or HCl. Vat prints are improved by a mild HCOOH + activin after treatment. E. R. Clark.

3. Desizing In High-Pressure Alkaline Treatments. Siegfried Kosche. *Klepzig's Textile-Z.* 41, 201-2 (1938). Large-scale expts. carried out with Viveral E. Aktivin S and Peraktivin are described. Best results were obtained by a combination of textile aids. Thus while Viveral E decomposes the starch, Igepon T in high concn. (used at the same time) wets and cleans the textile and Peraktivin bleaches by slow decompn. and evolution of O. The white tint obtained with Peraktivin is very close to that obtained with the combined O-Cl bleach. There is no danger of formation of oxycellulose if the kettle is well aired; no hydrocellulose can be formed, as the material is exposed to the Cl soln. for only 3 hrs. (*Chem. Abstracts* 1938).

4. Chlorine Baths, Oxycellulose And Yellowing. Ernst Kornreich. *Melliand Textilber.* 18, 304-5 (1937). The article is primarily a reply to (*Chem. Abstracts* 13, 5587). K. attributes yellowing to the action of chloramine. (*Chem. Abstracts* 1937).

MOHR PROCESS

1. Bleaching, Of Textiles, By Hot And Cold Processes. *Chem. Abstracts* 1928, p. 321.[6] From Hot Bleaching to Cold Bleaching (Of Textiles). H. Lagache. *Tiba* 5, 699-709, 835-47, 1079-91. 1223-35 (1927).—A detailed description and discussion of the Thiess-Herzig and Mohr bleaching processes, bringing out the advantages of the latter.

2. Bleaching, Of Cotton. *Chem. Abstracts* 1927, p. 2069.[8] Mohr Bleaching Versus Boiling Bleaching. Leo Kollman. *Melliand Textilber.* 8, 270-3 (1927).—A given cotton fabric was bleached according to the Mohr system using oxidizing alkalies and by the ordinary 1 and 2 boil processes using NaOH and then NaOCl. The products were analyzed in detail, the more important data, applying in the above order, being as follows: increase in length, 4.0, 4.7 and 6.0%; decrease in width, 6.2, 6.2 and 6.7%; loss in wt. per running m. 11.2. 13.2 and 15.4%; strength, warp +9.6, +3.9 and +5.0%; filling, —7.6 and —2.6 and —1.2%; ash; 0.153, 0.104 and 0.060%; ether-sol. 0.300, 0.357 and 0.156%; $KMnO_4$ no. 542, 481 and 417. It is suggested that for cheap styles the Mohr process does well enough.

3. Bleaching, Of Cotton, Cold Vs. Boiling. *Chem. Abstracts* 1926, p. 1720.[6] Cold Bleaching (of cotton) As Opposed to Boiling Bleaching. M. Freiberger. *Textilber.* 7, 148, 226-7 (1926).—The Mohr system is uneconomical, dangerous to the goods, and not particularly new.

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NNE December Meeting Notice

THE next meeting of the Northern New England Section will be held December 1 at the Hotel Vendome, Boston, Mass. Dinner will be held at 6:30 with E. B. Bell in charge of reservations.

The meeting, scheduled for 8, will feature George H. Schuler, Director of the Technical Laboratory, Organic Chemistry Department, E. I. du Pont de Nemours & Co., Inc. His subject will be: "The Story of the Standardization of Dyes".

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Method of Measuring—

(Continued from Page P812)

Work is in progress to determine the possible applicability of this test in a number of directions. These possibilities include the following:

1. A possible correlation of the penetration of a surface-active agent with the penetration of dyestuff is being sought. The dye penetration test described by Professor Skinkle is his recent article on "Evaluation of Dye Characteristics" in the AMERICAN DYESTUFF REPORTER is being used with various surface-active agents that show good penetrating properties in the new test. Some interesting results have been obtained so far, but there are not enough data available at present to warrant any conclusions.

2. Tests are being run to determine possible correlation of test results with air permeability.

3. This apparatus has been tried as a means of determining whether various finishes impart hydrophobic or hydrophilic properties. The interpretation of these test results has required a knowledge of air permeability changes that have taken place in the fabric due to the finishing. It does, however, seem to be sensitive to relatively slight changes in hydrophilic properties if changes in air permeability are considered. I have been using an inverse ratio between test times and values of air permeability to obtain a predicted test time. When actual test times are less than the predicted values, the finish is considered to have imparted hydrophilic properties. Values greater than the predicted test time are consideerd to be due to hydrophobic properties of the finish. Values in close agreement with the predicted test value are considered to have caused no changes in water-attracting properties. The ratio used is:

$$\frac{P\ \text{orig. cloth}}{P\ \text{treated cloth}} = \frac{t\ \text{treated cloth}}{t\ \text{orig. cloth}}$$

where P = air permeability values.
t = apparatus test values.

This does require knowledge of the air permeability of the fabric and the test time of the original fabric. In cases where the fabrics have a high degree of absorbency, water is used instead of a wetting agent.

The work done on this phase of the test thus far has been only exploratory.

4. The electrical part of this apparatus is at present under consideration by Mr. Mandikos of the AATCC research staff here at Lowell as a means of obtaining a better endpoint for the AATCC rain tester.

5. The last subject under investigation is the use of this apparatus to determine the relative money values of various wetting agents. Edelstein and Draves *(1)* have stated in a recent paper published in the AMERICAN DYESTUFF REPORTER that the Draves Test should be used to determine relative money values only when the agents under test give parallel lines for logarithmic plots of sinking times against concentrations for a given hook.

Before I conclude this presentation, I should like to express my gratitude to Professor Skinkle, Mr. Na, and all those instructors and students whose interest and help have made this paper possible.

REFERENCES

(1) Edelstein, S. M. and Draves, C. Z. *Am. Dyestuff Reptr.* 38, 343 (1949).

(2) *Rohm and Haas Technical Bulletin,* "The Tritons" p. 4. Rohm and Haas Co., Philadelphia (1949).

(3) *Technical Manual and Year Book* of the A.A.T.C.C. Volume 25, p. 143 (1949).

(4) Seyferth, H. and Morgan, O. M. *Am. Dyestuff Reptr.* 27, 525 (1938).

NEWS

QUEBEC SECTION, CATCC, MEETING SCHEDULE

Following is the schedule of meetings for the Quebec Section of the Canadian Association of Textile Colorists and Chemists for the balance of the 1950-51 season:

December 9, 1950—McGill University

"The Dyeing, Printing and Finishing of Viscose Rayon"——Elliot Broadbent, Glenlyon Print Works, Phillipsdale, Rhode Island.

January 20, 1951—Mount Royal Hotel

"The Stabilization of Fabrics".

Cotton—C. Wills, The Montreal Cottons, Ltd., Valleyfield, Quebec.

Wool—Dr. L. H. Turl, York Knitting Mills, Ltd., Toronto, Ontario.

Rayon—Dr. C. E. Coke, Courtaulds (Canada) Ltd., Cornwall, Ontario.

Nylon—Dr. R. D. Bennett, Canadian Industries, Ltd., Nylon Division, Kingston, Ontario.

February 17, 1951—McGill University

"Direct Dyeing of Cotton with Copper-Aftertreated Dyes"——Dr. Charles J. Weidmann, Ciba Co., Ltd., Montreal, Quebec.

March 17, 1951—McGill University

"Sizing and Desizing of Synthetic Warps"——Charles F. Bishop, Monsanto Chemical Co., Boston, Mass.

April 21, 1951—Mount Royal Hotel

Fifteenth Annual Meeting and Banquet.

June 16, 1951—Lachute Golf Club

Annual Gold Tournament.

Meetings at McGill University will be held in the Main Lecture Theatre of the Chemistry and Mining Building and will start at 7:30 P.M. The January 20th meeting will be held in the Ballroom of the Mount Royal starting with a buffet dinner at 7:00 P.M. which will be followed by the business session.

• Symposium Featured at ACCCE Meeting

A symposium, "Public Relations and the Consultant" highlighted the annual dinner meeting of the Association of Consulting Chemists and Chemical Engineers, Inc., held at New York's Hotel Shelburne on Oct. 24. Paul B. Slawter, Jr., Vice-President of The House of J. Hayden Twiss, New York, was the main speaker of the evening and John Sasso, Industrial Production Editor of *Business Week*, acted as moderator. A discussion from the floor followed Mr. Slawter's address.

• Zurn and Cole Head PTI Board of Governors

Frank P. Zurn, Alco-Zander Company, and J. Marshall Cole, Cold Spring Bleachery, were elected Chairman and Vice Chairman, respectively, at the first organizational meeting of the Board of Governors of the Philadelphia Textile Institute, held at the school on October 5. Mr. Zurn succeeds Rinaldo A. Lukens, now president of the Board of Trustees; Mr. Cole succeeds Theodore B. Hayward, now Chairman of the Board of Trustees. Appointment of various committees will take place shortly.

• New H-D Price Lists Reveals Addition of 13 Products

A new price list, covering acid and basic dyestuffs, eosins and fluoresceins, fast color bases and salts, and naphthols, has been issued by the Hilton-Davis Chemical Company Division, Serling Drug Inc., replacing a listing distributed last February.

The new listing reveals that the division has added the following 13 products in this line during the past six months:

Acid Colors—Hidacid Naphthol Green B (C.I. 5), Hidacid Fast Red A Concentrated (C.I. 176).

Chrome Colors—Hidachrome Yellow 2G Concentrated (C.I. 36), Hidachrome Orange R Concentrated (C.I. 40).

Fast Bases—Hiltonil Fast Red RL (C.I. Pr. 272), Hiltonil Fast Orange R (C.I. 38).

Fast Color Salts—Hiltosal Fast Orange GR (C.I. Pr. 265), Hiltosal Fast Red AL (C.I. Pr. 267), Hiltosal Fast Black K (C.I. Pr. 256).

Naphthols—Hiltonaphthol AS-ITR, Hiltonaphthol AS-BR, Hiltonaphthol AS-HB, Hiltonaphthol AS-EL.

• NBS Selects Four New pH Standards

Four new pH standards, intended to provide fixed points at the upper and lower ends of a standard pH scale, have been selected by chemists of the National Bureau of Standards. The new solutions extend the accuracy of standard scales made to conform with the three middle-range standards* which the Bureau now distributes to the chemical industry.

In a recent study, R. G. Bates, Gladys G. Pinching and E. R. Smith of the Bureau's physical chemistry laboratory determined the extent of inaccuracy at the ends of the practical pH scale. They concluded that an instrument calibrated with the present solutions of intermediate acidity will usually yield results that are low by 0.02 to 0.05 unit or more above pH 11. Below pH 2.5, errors as great as 0.03 unit, either positive or negative, were reportedly found. In general, solutions of strong acids and bases display larger errors than buffered solutions, it is stated.

In the course of the work 41 solutions of possible value were examined and out of these, the following four standards were selected:

1. A mixture of sodium bicarbonate and sodium carbonate, both at 0.025 molar concentration, with a pH of about 10 at room temperature.

2. A 0.01 molar solution of trisodium phosphate, pH about 11.7.

3. A solution of potassium hydrogen tartrate saturated at room temperature, pH about 3.6.

4. A 0.01 molar solution of potassium tetroxalate, pH about 2.1.

Although the new standards lengthen the accurate portion of the scale in both directions, it is reported the measured pH of highly acid and highly alkaline solutions must still be assigned an uncertainty of at least $\pm$ 0.03 unit.

The Bureau plans to add the potassium hydrogen tartrate and the potassium tetroxalate to the Standard Samples it issues when an adequate supply of the purified materials has been obtained, tested and bottled for distribution. An announcement of their availability will be made in their *Technical News Bulletin.*

* For further technical details, see Standardization of the pH scale, NBS *Technical News Bulletin*, 31, 138 (1947).

• 7th Annual National Technical Conference

The Seventh Annual National Technical Conference of the Society of Plastics Engineers, sponsored by the New York and Newark Sections, will be held Jan. 18-20, 1951, at the Hotel Statler, New York, N. Y. The theme of the Conference is "PLASTICS SHAPE THE FUTURE," and the technical papers to be presented will review achievements in plastics during the past 50 years, and forecast the course of future developments during the next. An integrated program of papers is planned to cover plastic materials, machinery, processing methods, and applications.

In addition to morning and afternoon technical sessions, the Conference program will include luncheon and banquet meetings, the Society's annual business meeting, the election of national officers for the coming year, a special ladies program, and the presentation of awards to winners in the Society's Prize Paper Contest.

James T. Growley, Celanese Corp. of America, and Stanley Bindman, Gemloid Corporation, are the co-chairmen of an overall committee which will handle all arrangements; Willard M. Preston, Kopper Co. Inc. is secretary; and William Lewi, Dusal Tool & Mold Co., is treasurer.

• Watson-Park Moves to Ballardvale

In order to be nearer their factory operations in order to integrate office activities and to expedite business transactions with customers and suppliers, the Watson-Park Company executive offices have been moved from their Boston location at 261 Franklin Street to Ballardvale, Mass., according to an announcement by Kenneth B. Park, President. Watson-Park, manufactures their line of dyestuffs, chemicals, textile soaps and oils, and stripping compounds at their Lowell Junction (Mass.) factory.

• MCA Opens N. Y. Office

The Manufacturing Chemists' Association, Inc. has opened an office at 330 West 42nd Street, New York, under the direction of Robert L. Taylor, executive vice-president, in addition to the Association's present offices in the Woodward Building, Washington, D. C. Activities of the new office will be devoted initially to public relations matters and the servicing of member needs and Association affairs in the New York area, it is stated.

The Washington staff, under the direction of the secretary, M. F. Crass, Jr., will continue to handle committee activities, transportation matters, and preparation and publication of the Association's bulletins, technical reports and safety data sheets. Plastics activities will also continue at this location under F. H. Carman.

OBITUARY

ARTHUR W. DAWES

ARTHUR W. DAWES, 71, one of the pioneers of dye-making in this country, died on October 10 at his home in Albany, N. Y., after more than a year's illness. A veteran of more than 50 years with the Rensselaer plant of General Aniline & Film Corporation, he was feted last year by the company and his co-workers.

A native of Manchester, England, Mr. Dawes came to the U. S. in 1899 following his graduation from the Manchester School of Technology and joined the staff of the American Color and Chemical Co., on Westerlo Island — a company which in 1903 merged with the parent company of General Aniline. When the production of dyestuffs was supplemented by the manufacture of pharmaceuticals in 1905, he played an important role in the synthesis and manufacture of the first aspirin made in America.

Although well past the retirement age for most men, Mr. Dawes had always been active in administrative as well as research problems. He was manager of the Rensselaer process development department up until 1945, after which he served as a consultant on research and development.

GEORGE H. SMALL

GEORGE H. SMALL, 63, southern sales manager for Nopco Chemical Co. and a member of the Southeastern Section, AATCC, died Thursday, October 12.

Mr. Small joined the Nopco organization in June, 1931. He was made District Sales Manager for eight Southern states in 1946, a position he held at the time of his death.

PERSONNEL

Dwight L. Turner

According to an announcement by W. Chester Cobb, Vice President in charge of sales for Arnold, Hoffman & Co., Incorporated, DWIGHT L. TURNER has been appointed Southern Sales Manager. He succeeds Mr. Cobb, who is transferring to the company's Providence, R. I., headquarters. Mr. Turner will be located at the company's Southern Headquarters, 2130 North Tryon Street, Charlotte, N. C.

DR. GILBERT THIESSEN, of Kiel, Wisc., former technical advisor for the Chemical Division of Koppers Company, Inc., has been named manager of the laboratory section of the Company's central Research Department, according to an announcement by Dr. G. F. D'Alelio, Vice President and General Manager of the Department. In his new post, Dr. Thiesson will supervise and direct all Koppers laboratory research performed on company-owned laboratories or plants and by contract in academic and commercial laboratories.

Dr. Thiesson became associated with a Koppers subsidiary as a technical bibliographer, while still engaged in graduate work at the University of Pittsburgh. In 1931 he accepted a position with the Illinois State Geological Survey and, in 1937, returned to Koppers as a chemist in the Company's Tar and Chemical Division. When Koppers formed a separate Chemical Division in October, 1946, he was named manager of the Division's development section and two years later he accepted the post of technical advisor for the Chemical Division.

W. F. CROWELL, JR., formerly a representative for Colgate-Palmolive-Peet Company, has joined the sales department of Moreland Chemical Company, Spartanburg, S. C.

The Technical Department of the Calco Chemical Division of the American Cyanamid Company, Bound Brook, N. J. has added the following recent graduates to the staff: GORDON KENYON, Toronto; ANDREW TOMCUFCIK, Yale; LESTER HASSEY, Wisconsin; CARLTON A. SEARS, JR., Michigan State; JOHN ANDERSON, Iowa State; MITCHELL DUDNIKOV, Rutgers; NATHANIEL J. McMANUS, V.M.I.; JOHN E. PRETKA and MAX BENDER, N.Y.U.; PENN SPITZER, Penn State; BENNETT BUELL, Wisconsin; LEON COTTRELL, Penn State; ZANE KAUFMANN, Kentucky; RENATA BREISACHER, Dunbarton; BARBARA HATCH, Cornell.

Dr. Joseph G. Davidson, Division President of the Carbide and Carbon Chemicals Division, Union Carbide and Carbon Corporation, S. Charleston, W. Va., has announced three new appointments. DR. EDWARD W. RUGELEY, former Superintendent of the Research and Development Dep't. at South Charleston, has been appointed Technical Director of the recently formed Textile Fibers Department. He has been with the Division since 1934. DR. GEORGE H. LAW, former Assistant Director of Research, has been named Associate Director of Research. He has been employed in the research work of the Division since 1929. At the same time, DR. RAYMOND W. McNAMEE, former acting Superintendent of the Research and Development Department, assumes Dr. Rugley's former post. He has been with the Department since 1933.

OSBORNE BEZANSON, vice-president and member of the executive committee of Monsanto Chemical Co., will resign to become president and a member of the board of directors of the Chemstrand Corporation effective Nov. 15, according to an announcement by DR. CARROLL A. HOCHWALT, whom he succeeds. The election of Mr. Bezanson, for many years active in operating and production activities, is part of the general plan which marks the entrance of Chemstrand into the production phase of its operations. Dr. Hochwalt, vice-president of Monsanto and coordinator of the company's research development and patent activities, also served as temporary president of Chemstrand during the initial research and development stage of their activities in the field of synthetic fibers. He will remain as a member of the Chemstrand board of directors. HARRY L. DALTON, vice president of American Viscose Corporation, has also been elected to the board of the Chemstrand Corporation, which is jointly owned by Monsanto and AVC.

Three Americans were recently elected to Fellowships in the Textile Institute, an international organization of textile technologists. Those elected include:

LYMAN EDWIN FOURT, Ph.D., 5510 Johnson Avenue, Bethesda 14, Maryland, Research Associate with the Harris Research Laboratories, Washington 11, D. C., who has made many contributions in biophysics and physics of large molecules, and has undertaken research work on the mechanical properties of fibers and fabrics.

ROGERS BURTON FINCH, D.Sc. A.T.I., Assistant Professor, Textile Division, Massachusetts Institute of Technology, Cambridge 39, Mass., and consultant to the U. S. Army and Air Force and to the Research and Development Branch of the U. S. Army General Staff.

H. F. MARK Ph.D., 99 Livingstone Street, Brooklyn 2, New York, Adjunct Professor, Director, and Full Professor of Organic Chemistry, Institute of Polymer Research, Polytechnic Institute of Brooklyn, author of books on the properties of wool and on the physics and chemistry of cellulose, and of numerous articles in scientific journals. In the United States, Dr. Mark is editor of journals dealing with polymer science and textile research, and has lectured to textile societies in England and the U. S. A.

ALWIN TONKONOGY of Process Plants Engineering Co., 45 Clinton St., Newark, N. J. has been appointed engineering consultant and sales representative for Manning & Lewis Engineering Co., 30 Ogden St., Newark, manufacturers of heat transfer equipment and process vessels, and will assist in expanding their line to include agitated process reactors, agitators, mixing equipment, rotary driers, crystallizers, evaporators and similar equipment.

THOMAS E. MOFFITT has been appointed Assistant Works Manager of the Tacoma, Wash., plant of the Hooker Electrochemical Co., according to Bjarne Klaussen, Vice President in charge of production. Mr. Moffitt was active in Northwest engineering at Spokane and Seattle from 1920-1930, when he first joined Hooker. He was Assistant Western Sales Manager until 1945 when he assumed the Western Sales Manager's position in Albert H. Hooker's absence for military service. From 1945 until the present, Mr. Moffitt was employed successively by Weyerhauser Timber Company and the Pennsylvania Salt Manufacturing Company. John D. Rue is Works Manager of the Tacoma plant.

ERNEST W. FINLAYSON has resigned as general manager of the Canadian Research Institute of Launderers and Cleaners to become associated with American Conditioning House, Inc., Boston, Mass., laundry, dry cleaning and textile consulting organization, as executive assistant to H. J. Wollner, president. For several years, a member of the (Canadian) Government Purchasing Standards Committee on Textile Specification Standardization, Mr. Finlayson served during World War II as officer-in-charge of mobile laundry design in Canada, the United Kingdom and Northwest Europe. He will cooperate with ARTHUR L. ANDERSON, formerly director of research of the American Institute of Laundering and now coordinator of textile and laundry research for American Conditioning House, in a study of new detergents and dry cleaning techniques to determine their adaptability to the needs of the textile and garment trades.

NEW PRODUCTS

• New Blanket for Printing Eliminates Backgray

The welding of natural and synthetic fibers with synthetic rubber into an endless blanket with a washable, absorptive and extremely durable print surface for textile printing has been accomplished according to a report from the Dewey and Almy Chemical Company, 62 Whittemore Avenue, Cambridge 40, Mass. The company states that the need for the conventional backgray has been eliminated, and backs the statement with two million yards of print cloth produced in a variety of constructions and patterns in cotton and rayon produced under plant conditions since the first of the year.

It is pointed out that the new blanket combines the best features of nylon backgrays with the Company's Darex embossed wash blanket.

• New Permanent Cartridge Water Demineralizer

A new, permanent Ion Exchange Demineralizer, which is said to operate at a fraction of the costs of distilled water, has been made available to laboratories and other users of up to 10 gallons/hr. of high purity, demineralized water by the Penfield Manufacturing Co., Meriden, Conn.

Designed to attach to any wall near a tap, the instrument has a permanent cartridge and is equipped with a flow meter sight indicator. An electric conductivity meter built into the unit provides visual indication of the quality of water being produced. No heat or steam power is required for operation.

• "Zeset," Durable Wrinkle- and Shrink-Resistant Finish

"Zeset", a durable wrinkle- and shrink-resistant finish for cotton and viscose rayon fabrics, has been placed on the market by the Du Pont Company. The product, which also imparts a soft, wool-like finish, is expected to be very popular with the housewife as well as the textile processor. The housewife should appreciate its ability to impart characteristics of spun viscose rayon fabrics which allow them to be laundered and bleached under usual home conditions without serious loss of strength and discoloration. From the standpoint of the processor, the ease of applicability and stability in storage are desirous.

The finish can be applied by any mill possessing "efficient padding, drying, heat treating, and wash equipment used in applying thermosetting resins". It is said to be diluted simply by mixing with water.

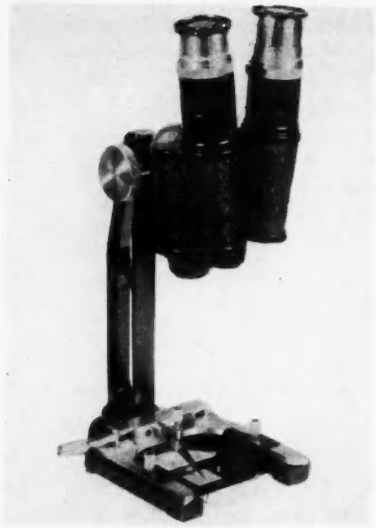
"Zeset" may be used with "Zelan" durable water repellent, and a combination of these two finishes on viscose rayon is said to impart, in addition to water repellency, the wrinkle resistance associated with wool. The new finish may also be used with softening or stiffening agents to modify the "hand" and feel of fabrics, it is reported. To date, "Zeset" has been applied primarily to viscose rayon and cotton fabrics, but applications for it are indicated in the treatment of linen and pile fabrics, such as transparent velvets.

Du Pont states that while most spun viscose rayon fabrics lend themselves to treatment with"Zeset," cotton fabrics must be properly selected for application of the finish. In general, cotton fabrics made of combed yarns and mercerized are better suited for processing with "Zeset."

A booklet describing the chemical and physical properties of "Zeset," and method of applying this new finish, has been prepared by the Fine Chemicals Division of the Du Pont Company.

• Clorpak CW

Clorpak Corporation, Textile Division, 10-15 43rd Avenue, Long Island City, New York, announces commercial production of Clorpak CW. The product is offered after two years of exhaustive tests as well as repeated commercial trial runs. Buffered closely to a pH of 5.5, this concentrated white semi-crystalline product, which is easily stored and handled, is said to form water solutions that have no free alkali. Clorpak CW may be used as a stripping agent for dyes and as a general bleaching agent. It is said to combine high efficiency with a minimum loss of tensile strength of the fabric. Literature and samples are available.



Scherr Binocular Microscope

• Wide-Field Binocular Microscope with Thread Counter

The George Scherr Co., Inc., 200 Lafayette St., New York 12, N. Y. has placed on the market a Wide-Field Binocular Microscope with an Oestermann attachment for counting fabric threads, which permits examination of a comparatively large section in various magnifications. 3 templets are furnished (¼", ½", and 1" square). A pointer attached to a precision slide with screw is moved along the cloth to facilitate counting. The stereoscopic, 3-dimensional image is fully erect and corresponds to actual movement, it is reported.

The instrument comes in 2 models. Model A (low power) has 2 pairs of interchangeable eyepieces; total mag. 4¼X and 6½X; fields of view 1.7" and 1.3", respectively; focal distance 8⅜". Model B (higher power) has 3 pairs of eye-pieces; mag. 10X, 20X, and 30X; fields of view 0.63", 0.43" and 0.32" respectively; focal distance 3⅛".

An illustrated bulletin is available from the manufacturer.

• Nytron, Caustic Corrosion Reducer

Primary laboratory tests of Nytron, new Solvay synthetic detergent, have revealed its property of substantially reducing the corrosive attack of straight alkaline solutions on glass surfaces. Weight loss of typical Coca-Cola bottles due to caustic soda attack was reported to be 14 times less with Nytron in the solution, according to tests conducted by the Application Research Laboratory of the Solvay Process Division, Allied Chemical and Dye Corporation; weight loss of glass microscope slides due to corrosion was reportedly reduced 210 times. Maximum inhibition was obtained with .10 to .25 per cent, in a 2 per cent caustic soda solution. Agitation of the solution reportedly prolonged the inhibiting action of Nytron, which averaged 2 weeks in duration.

A 26-page report describing full details of the research project is available without charge from Solvay's offices at 40 Rector St., New York, N. Y.

• Depcolin

Depcolin, an aniline black developing agent as well as a protective compound against fiber tendering by aniline black, has been announced by the DePaul Chemical Co., Inc., 44-27 Purvis St., Long Island City 1, N. Y. It is used for both dyeing and printing and prevents the color turning to a greenish cast, also preserving the fiber strength of the material, it is stated. Further advantages listed include the elimination of aniline oil odor from the finished goods and better stability of padding liquors and printing pastes than that obtainable by the usual aniline black process.

• Winding Equipment for Yarn Dyeing Tubes

Equipment for successfully winding acetate and viscose rayon yarns onto 1⅝" metal package dyeing tubes has been developed by Foster Machine Company, Westfield, Mass. It consists of 1⅝" holders and pressure roll assemblies and, hence, is reported suitable for fitting to current Foster Model 75 winders. Winding is direct from the supply and no feed rolls are required.

Rayon yarn tension can be as low as 4 grams and No. 5 Durometer reading, it is reported, making a soft package to facilitate quick and uniform dye penetration.

• Speed Ratio Change Recorder

A continuous record of roll speed ratio is provided by means of a new Tag-Weston recording speed-ratio tachometer offered by the Tagliabue Instruments Division, Dept. 414, the Weston Electrical Instruments Corporation, 614 Frelinghuysen Avenue, Newark 5, N. Y. The instrument is said to enable determination of stretch or shrinkage of materials being processed through roll pairs turning at different speeds. Various calibration ranges and chart graduations are available. Ratio meter and recorder can be calibrated to any units which are a function of the speed ratio between the two rotating members.

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No. 17 of a series

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Calconyl* Red B Single Solution and Calconyl Red B Double Solution are the solution forms of a new azoic red

for printing cotton and viscose. They produce a very blue-shade red of good all-around fastness properties, when applied by the usual procedure for printing stabilized azoic dyes.

The most important fastness properties of this new product are: Light . . . 5; Cotton Wash Test No. 3 . . . 4-5; Cotton Wash Test No. 4 . . . 4; Chlorine (0.3% Available Chlorine) . . . 4; Hot Pressing . . . 5; Dry Cleaning . . . 5; and Plissé . . . 5.

Bright, blue-shade reds up to the present have been difficult to produce for this type of printing, and Calconyl Red B Single Solution and Calconyl Red B Double Solution should be well received to fill this need.

Samples of this new red may be obtained by asking your Calco representative. *Trade-mark

Minimizing Specks in Dyeing Vat Blues

A thorough study of the causes of specking of cotton and viscose piece goods by vat blues of Color Index No. 1113, has revealed that there are a number of contributing factors. Among these factors are the design and operation of the equipment, the method of application, including all ingredients of the formula, and the physical nature of the dye.

Calcoloid* Blue BLNS Double Paste has been developed to help minimize specking under normal piece goods dyeing conditions. Specking problems are usually most prevalent in continuous dyeing where pigment padding and subsequent reduction and dyeing is accomplished, either by steaming or by booster baths. Good dispersion and the proper physical characteristics of the dye particle are essential in the padding liquor. Calcoloid Blue BLNS Double Paste is an improved blue, compounded on the basis of information obtained in these studies, to produce the most ideal physical conditions in the padding operation. *Trade-mark

Economical Navies

There are numerous ways of producing pleasing navy blues on wool, depending on the fastness requirements, and the condition of the material to be dyed, such as yarn, raw stock, piece goods, etc. The cost and fastness of navies produced by various dyes or combinations of dyes will vary greatly, but one of the most economical and popular formulae consists of a combination of Wool Green S with Victoria Fast Violet 2R Extra. The excellent economy and good working properties of this combination have made it a reliable method of producing a wide range of navy shades on sweater yarns, knitting yarns, ladies' dress goods, ladies' felt hats, and other uses requiring a fair degree of light fastness but where good wash fastness is not of prime importance.

The navies thus produced are rich, bloomy shades which are pleasing both under artificial light and normal daylight.

Calcocid* Green SB Extra Conc., Calcocid Green S Extra Conc., and Calcocid Fast Violet 2R Conc. should be recommended for the production of such navies. *Trade-mark

For the Textile Bookshelf

Measurement of Dye Strength (Calco Technical Bulletin No. 812) by E. I. Stearns. Of fundamental use to dyestuff users; discusses methods of evaluating relative strengths of dyes and factors affecting strength methods.

Light Fastness Ratings of Vat Dyes On Cotton (Calco Technical Bulletin No. 813) by M. Babey, S. J. Luscian and R. J. G. Schofield. Provides the dyer with more complete and more exact information on the light fastness of vat colors on cotton.

Revision—Descriptive Index of Calco Technical Bulletins (Calco Technical Bulletin No. 761A, New Second Edition). Abstracts all bulletins published to date; helpful cross-index aids in selecting bulletins pertaining to special problems.

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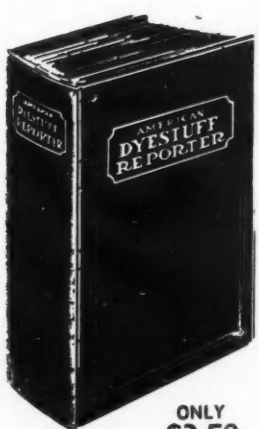

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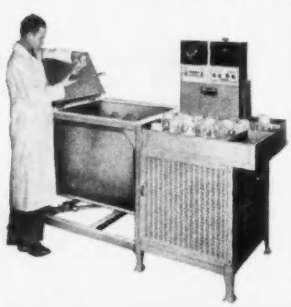
Technicians at this laboratory conduct washing tests of the A. A. T. C. C. in the Launder-Ometer to determine the fabric's resistance to shrinking, its color fastness, and resistance to washing and mechanical action. The Fade-Ometer is used to obtain factual data regarding the degree of fading registered on the sample by sunlight, temperature, and humidity. The Atlas cycle timer unit can be set to duplicate any test at any time.



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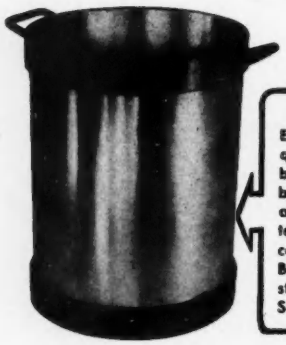

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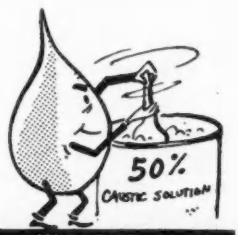

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